June 2021 | Settings and Trends

BUTTE COUNTY GENERAL PLAN

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INTRODUCTION

This Butte County General Plan Setting and Trends document, encompassed by the 19 chapters following this introduction, provides an overview of existing physical, environmental, economic, and other conditions in the unincorporated parts of Butte County, as of early 2021. This document is intended to serve as a comprehensive reference and resource for community members, policymakers, staff, and the consultant team throughout the update to the Butte County General Plan.

The General Plan update is a two-year process aimed at addressing the latest legislative requirements and significant changes to the needs and opportunities present in Butte County following the Oroville Dam Crisis, Camp Fire, North Complex Fire, and the passing of 10 years since the 2030 General Plan was adopted. The update will extend the horizon year of the General Plan to 2040 and will guide local development over the next two decades. This Setting and Trends document provides information about existing conditions in the county and provides information to support the existing setting for the Environmental Impact Report, which will investigate the potential impacts from implementing the General Plan policy changes on the physical environment.

This chapter serves to:

- Introduce Butte County, including its regional setting and boundaries;
- Explain why the County is pursuing this update to the General Plan;
- Provide an overview of this Setting and Trends document, including its structure and contents, as well as the process by which it was developed; and
- Provide an introduction to the General Plan, including its basis in State of California planning law and its required contents and structure.

A. Butte County

This section provides a brief overview of Butte County's regional location, political boundaries, and principal characteristics in terms of topography and land use. More detailed information on these aspects is provided in the various chapters that follow.

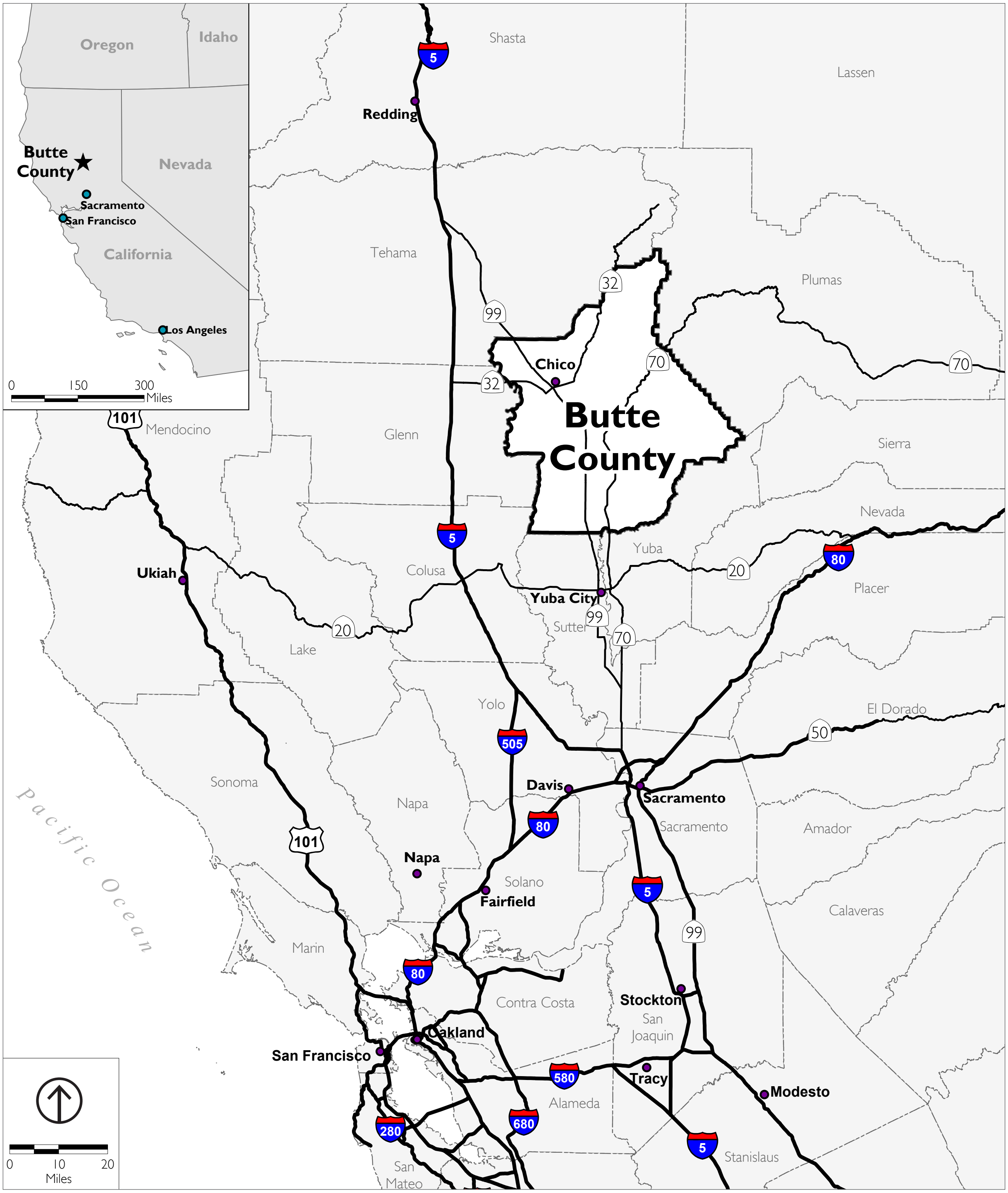
1. Regional Setting

Figure i-1 shows Butte County's regional setting. Butte County lies in north central California at the northern end of the Sacramento Valley, approximately 150 miles northeast of San Francisco and 70 miles north of Sacramento. Highways 70 and 99, which extend in a north to south direction through the county, define the principal transportation corridors connecting the county to the region. Highways 32 and 162 provide sub-regional connections to areas to the west of the county and to Interstate 5.

2. County Boundaries, Communities and Land Use

Butte County is in the northeastern part of the Sacramento Valley and extends into the Northern Sierra Nevada foothills and mountains that rise to the east of the Sacramento Valley floor. Its boundaries were first established in 1850 as part of the original partition of California into 27 counties. In 1856, the county's boundaries were redrawn to their current configuration. Elevations range from approximately 60 feet in the southwest corner of the County, adjacent to the Sacramento River, to 8,100 feet in the northeast corner, near Butte Meadows. The total land area of Butte County is approximately 1,680 square miles (1,073,000 acres)[1] and can be divided into three general topographical areas: a valley area, a foothill region east of the valley area, and a mountain region east of the foothills. These topographic areas comprise approximately 45 percent, 23 percent, and 31 percent, respectively, of the county's land.

[1] Butte County Geographic Information Systems, November 21, 2006.



Source: PlaceWorks, Butte County General Plan 2030 Setting & Trends Report, 2007.

Figure I-1

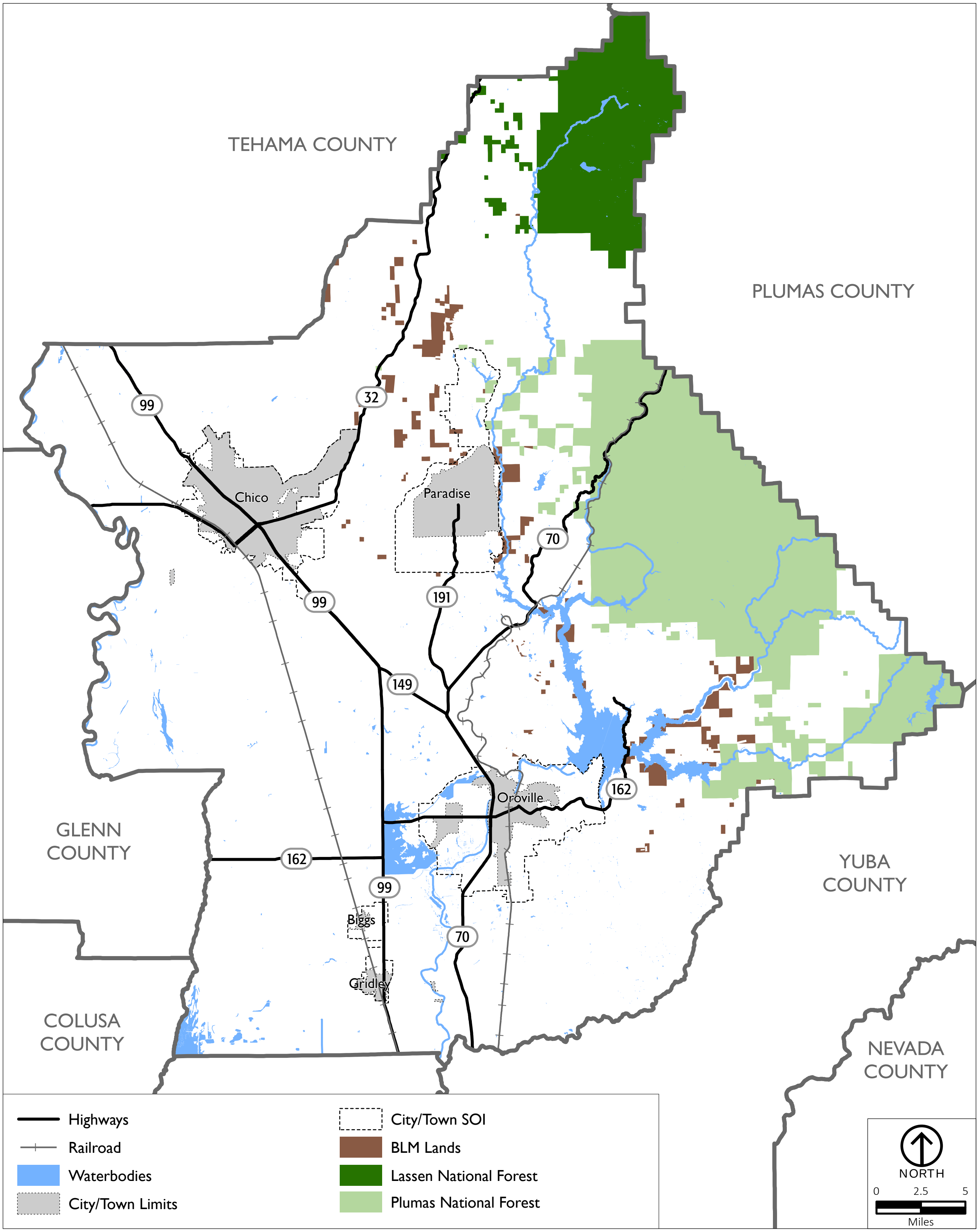
Regional Location

Butte County is bounded on the west by Glenn and Colusa Counties, with the Sacramento River and Butte Creek forming portions of the westerly boundary. To the north and northwest, the county adjoins Tehama County; to the east, Plumas County; and on the south and southeast, Sutter and Yuba Counties. The South Fork of Honcut Creek forms the southeast boundary with Yuba County. Aside from the lines of demarcation created by the Sacramento River, Butte Creek, and Honcut Creek, the county's boundaries do not reflect natural features or changes in landscape character. From major entries in the south and north, the Butte County line is strictly a legal boundary and does not reflect any change in physical character from the adjoining county.

Figure i-2 displays the Planning Area for the Butte County General Plan. The county includes five incorporated municipalities (Chico, Oroville, Paradise, Gridley, and Biggs) and numerous small unincorporated rural communities.

The U.S. Forest Service is a major landowner in Butte County with holdings in Plumas National Forest and Lassen National Forest totaling 134,840 acres of federally owned National Forest Land.[2] The U.S. Bureau of Land Management owns 15,590 acres, mostly consisting of scattered foothill lands.[3] Combined, these two federal agencies own and control 14 percent of the land area in Butte County.

[2] Butte County GIS, 2021; PlaceWorks, 2021.
[3] Butte County GIS, 2021; PlaceWorks, 2021.



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE I-2

PLANNING AREA

Urban land constitutes a proportionally small share of total land area in Butte County. In 2016, the most recent year that the Statewide Farmland Mapping and Monitoring Program has data for Butte County, urban land uses occupied 72.9 square miles or 4.3 percent of all county land.[4] In 2021, incorporated areas of the county accounted for 3.7 percent of all county land.[5]

B. Why Update the General Plan Now?

General Plan 2030, adopted in 2010, was designed to serve as a guiding document for the county's development through the year 2030. However, since the General Plan was prepared, Butte County has endured major events that have substantially changed and affected its communities, most notably the Oroville Dam Crisis in 2017, the 2018 Camp Fire, and the 2020 North Complex Fire.

The Oroville Dam Crisis in February 2017 involved the emergency evacuation of more than 180,000 people. It resulted from damage to the main and emergency spillways of the Oroville Dam, which created the potential for uncontrolled and life-threatening water flows to the low-lying areas downstream in Butte, Yuba, and Sutter Counties.[6]

Less than two years later, in November 2018, Butte County suffered the deadliest and most destructive wildfire in California's history, when faulty transmission lines above Poe Dam, near Pulga in unincorporated Butte County, sparked from high winds, igniting a fire that quickly spread down into the developed unincorporated communities of Butte Creek Canyon, Concow, Magalia, Upper Ridge, and the Town of Paradise. The Camp Fire resulted in the death of 87 people, 3 CAL FIRE firefighters, and 84 residents; the destruction of 14,500 structures, including 13,696 single-family homes and 276 multifamily structures; and damage to another 589 structures.[7] Before communities could fully recover and rebuild, in August 2020,

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[4] Butte County, 2021; PlaceWorks, 2021; Statewide Farmland Mapping and Monitoring Program, 2016.

[5] Butte County GIS, 2021; PlaceWorks, 2021

[6] Association of State Dam Safety Officials, *Case Study: Oroville Dam (California 2017)*, accessed February 20, 2021, https://damfailures.org/case-study/oroville-dam-california-2017/.

[7] Butte County District Attorney, *The Camp Fire Public Report: A Summary of the Camp Fire Investigation*, June 16, 2020, https://www.buttecounty.net/Portals/30/CFReport/PGE-THE-CAMP-FIRE-PUBLIC-REPORT.pdf?ver=2020-06-15-190515-977.

the North Complex Fire was sparked during a lightning storm. The North Complex Fire ravaged the southeast portion of the county and caused the death of 16 people and destroyed 2,445 additional structures, primarily in the Berry Creek and Feather Falls communities.[8]

All three of these events were caused, in part, by environmental conditions—heavy rainfalls and wildfire conditions (including prolonged drought, extreme heat, and high winds)—which are anticipated to increase in frequency and intensity because of climate change. In addition, these events painfully illustrated the importance of advance planning to minimize the threat of hazards and impacts when such events do occur. Climate adaptation and resilience will be a key focus of General Plan 2040, which will include a comprehensive update to the Health and Safety Element.

The impact of the fires on the region's housing supply comes at a time when the entire state is facing a housing crisis. The update to the County's Housing Element will address new challenges to accommodate Butte County's projected housing need while considering what locations are appropriate for housing and at what density to ensure adequate supply and affordability.

These major events are driving the update to the General Plan, but the update will not be limited to hazards, climate adaptation, and housing. It will also take the opportunity to promote environmental justice and address other new State of California requirements, described in more detail in Section D, The General Plan.

This update is a proactive and calculated action of Butte County staff and elected leadership to ensure that Butte County continues to make progress toward the community's vision for its future, as described in the General Plan:

The General Plan envisions and supports a Butte County where:

- Urban development will be primarily centralized within and adjacent to the existing municipal limits and larger unincorporated communities. Urban development will have efficient, reliable public facilities and infrastructure. Employment centers and a range of services will be located near residential areas so that people spend less time in their cars. Residential communities will be walkable, bicycle facilities will be provided, and there will be access to public transit.

[8] U.S. Forest Service, Plumas National Forest, North Complex Fire Update, December 4, 2020, https://inciweb.nwcg.gov/incident/6997/.

- ♦ Small unincorporated areas will be well-planned through community-driven planning processes so that community character is preserved and adequate public services and facilities are provided. Rural residential development will be limited and will strive to be compatible with agricultural and environmental uses and will address wildfire risks and public service needs.
- ♦ Agriculture and open space will continue to dominate Butte County's landscape and be an important part of the County's culture and economy. Existing agricultural areas will be maintained and an array of agricultural services will support agriculture while providing new jobs to Butte County residents.
- ♦ At the same time, new and innovative high-technology businesses will be located in Butte County, including green business and industry, attracted in part to the natural and urban environment of the county and in part to the opportunities for partnerships with Butte County's educational institutions. Butte County's residents will have a choice of housing types to best suit their individual lifestyles.
- ♦ County youth will have safe places to socialize, job and volunteer opportunities, and access to higher education and support services. They will be able to safely walk, bike, or take transit to school, and recreational programs will fulfill their after-school needs.
- ♦ Butte County will have safe, clean water for agriculture, residents, and businesses. Water resources will be protected through proper planning and regulation, as well as continued research and monitoring by Butte County and its partners in watershed planning.
- ♦ Wildlife and native plants will survive and thrive in healthy ecosystems. Sensitive natural resources, including deer herd migration areas, will be protected, and Butte County will continue to coordinate with the Butte Regional Habitat Conservation Plan and Natural Community Conservation Plan. Residents of and visitors to Butte County will be able to enjoy the area's wealth of natural beauty, recreational opportunities, and amenities.
- ♦ And, finally, as the cumulative result of the efforts, Butte County's residents will have access to healthy living and lifestyle options. Through implementation of this General Plan, Butte County in 2040 will be an economically and environmentally sustainable community, the residents of which will enjoy a high quality of life, as did their forebears.

C. Setting and Trends Structure and Contents

This General Plan Setting and Trends document consists of this introduction, followed by 19 chapters that describe the regulatory setting and existing conditions within the county for the following subject areas:

1. Land Use
2. Population
3. Economics
4. Environmental Justice
5. Transportation and Circulation
6. Wastewater and Solid Waste
7. Public Services
8. Recreation
9. Cultural Resources
10. Scenic Resources
11. Mineral Resources
12. Water Resources
13. Biological Resources
14. Energy
15. Air Quality
16. Noise
17. Hazards and Safety
18. Agriculture
19. Greenhouse Gas Emissions

This document is based on a number of sources, and reflects, to the extent possible, current information as of early 2021. It is an update of the Setting and Trends document prepared in 2007 to inform the development of General Plan 2030. The original document incorporated and built upon previous reports, including the *Butte County General Plan Draft Background Report,* written in March 1993; the *Master Environmental Assessment* of 1996; the *Unpublished Butte County General Plan Technical Background Report*, written in 1998-1999; and the *Background Report,* written in 2005.

D. The General Plan

Butte County's General Plan is the legal document that serves as the county's "blueprint" or "constitution" for land use and development. State law requires every city and county in California to adopt and maintain a General Plan that is comprehensive and long-term. The plans must outline proposals for the physical development of the county or city and any land outside its boundaries which in the planning agency's judgment bears relation to its planning.[9]

General Plans must be comprehensive both in their geographic coverage and in the range of subjects they cover. General Plans must also be long-term in perspective. General Plan time horizons vary but typically range anywhere from 15 to 25 years into the future; this General Plan update will extend the horizon year of the Butte County General Plan to 2040.

Every General Plan in California must address at least eight topics or "elements." The importance of each of the required topics will, of course, vary from community to county. Following are brief descriptions of what California law requires be addressed in each of the eight elements:

1. The *Land Use Element* designates the general distribution and intensity of all uses of the land in the county. This includes residential uses, commercial uses, industrial uses, public facilities, and open space, among others.
2. The *Circulation Element* identifies the general location and extent of existing and proposed major transportation facilities, including major roadways, rail and transit, and airports.
3. The *Housing Element* assesses current and projected housing needs and sets out policies and proposals for the improvement of housing and the provision of adequate sites for housing to meet the needs of all economic segments of the community.
4. The *Conservation Element* addresses the conservation, development and use of natural resources including water, forests, soils, rivers, and mineral deposits.
5. Overlapping the Conservation and Safety Elements, the *Open Space Element* details plans and measures for preserving open space for the enhancement, promotion, and protection of natural resources, such as wildlife habitat; the managed production of resources, such as agricultural and timber land; outdoor recreation, such as parks, trails, and scenic vistas; and public health and safety, such as areas subject to geologic hazards, flooding, and fires.
6. The *Noise Element* identifies and appraises noise problems and includes policies to protect the community from excessive noise.

[9] California Government Code Section 65300 et seq.

7. The *Safety Element* establishes policies and programs to protect the community from risks associated with seismic, geologic, flood, and wildfire hazards and must also address climate adaptation and resiliency strategies.
8. The *Environmental Justice Element* addresses the topics of pollution exposure and equitable access to resources and opportunities to advance environmental justice. The requirement for an environmental justice element is relatively new, stemming from Senate Bill (SB) 1000, which was enacted in 2016. Environmental justice means the fair treatment of people of all races, cultures, and incomes in decisions about land use and other environmental regulations so that no communities are disproportionately burdened by pollution.

While the General Plan is required to include these elements, State law allows communities to determine the most appropriate structure and format for their General Plan. For example, many communities choose to combine the Open Space and Conservation Elements into a single element, due to the many commonalities between the topics addressed in them—this is what Butte County had done in General Plan 2030. The General Plan may also address additional topics that the county feels are relevant to its development, such as agriculture, economic development, historic preservation, and urban design. General Plan 2030 contains 10 elements: Land Use, Housing, Economic Development, Agriculture, Water Resources, Circulation, Conservation and Open Space, Health and Safety (which includes noise), Public Facilities and Services, and Area and Neighborhood Plans. General Plan 2040 will retain these elements and add an Environmental Justice Element. In addition to adding the new Environmental Justice Element, the updates will focus primarily on the following elements, although all elements will be reviewed for internal consistency: Land Use, Housing, Circulation, Health and Safety, and Water Resources.

For each mandated or optional issue addressed, the General Plan must do the following:

- ♦ Describe the nature and significance of the issue in the county (Background Information).
- ♦ Set out policy in text and maps for how the jurisdiction will respond to the issue (Policies).
- ♦ Outline specific programs for implementing policies (Actions).

No General Plan element is deemed more important than another; all carry equal weight. While, as noted above, the format and structure of the General Plan is left to local discretion, all substantive parts of the plan must be consistent with one another (i.e., internally or "horizontally consistent"). For instance, the policies in the land use element must be consistent with those of the housing element and vice versa.

State law also requires subsequent documents drafted to implement the General's Plan's objectives to be consistent with the plan. This "vertical consistency" extends to community and specific planning efforts and General Plan implementation through County ordinances.

1 LAND USE

This chapter describes land use in Butte County. The chapter is divided into two major parts. Part I describes the regulatory setting that guides land use in Butte County, including County plans, policies, and land use designations as well as other planning documents and processes that affect land use. Part II describes the physical form of the county, existing land uses and development patterns, and patterns of land ownership.

I. REGULATORY SETTING

Butte County uses a variety of tools to plan for future growth, including the General Plan, Specific Plans, Area Plans, and Zoning Code. Within the five incorporated municipalities, local General Plans guide development, and the Butte County Local Agency Formation Commission (LAFCO) has jurisdiction over the future annexation of unincorporated County lands within each municipality's surrounding sphere of influence (SOI). LAFCO is a State of California (State)-mandated local agency that oversees boundary changes to cities and special districts, the formation of new agencies including incorporation of new cities, and the consolidation of existing agencies. A city's SOI is the area immediately outside the jurisdiction boundaries that is likely to be annexed by the jurisdiction in the foreseeable future. A variety of other County regional plans and policies influence land use, as do those of state and federal agencies that own land or possess permitting or review authority.

A. Butte County General Plan

Key among the regulatory documents controlling land use is the *Butte County General Plan.* The General Plan provides the comprehensive, long-term framework for development in the county, and for the protection of its agricultural, natural, and cultural resources. Developed in accordance with State general plan requirements, it outlines policies, standards, and programs and sets out plan proposals to guide day-to-day decisions concerning growth, development, and conservation in Butte County, in keeping with the long-term vision for the county's future.

1. General Plan Content and Organization

In this document, "existing General Plan" refers to the *Butte County General Plan 2030* as it stands as of February 2021. The existing General Plan consists of a collection of 10 topical chapters, or elements, that were adopted in 2010, with the exception of the Housing Element, which was adopted in 2014 and the Health and Safety Element. Since its initial adoption, portions of the existing General Plan have been amended and supplemented.

The following sections describe each of the existing General Plan elements, briefly summarizing their structure and general content.

a. Land Use Element

The existing Land Use Element is divided into five parts. The first provides background information on existing land uses, jurisdictional boundaries, and planning efforts in Butte County. The second part describes land use designations and includes a map showing the location of each land use designation. The third part describes the characteristics of each overlay in the existing General Plan. The fourth part provides information on the Area Plans, Specific Plans, and Planned Unit Developments in the County. The fifth part is the statement of County concerns and policies, which are presented in 10 sections: (1) Land Use Map; (2) General Land Use and Planning; (3) Infill Development; (4) Infrastructure Planning; (5) Coordinated Planning and Sphere of Influence Issues; (6) Chico Area Greenline; (7) South Oroville/Las Plumas Area; (8) Development Patterns; (9) Area and Neighborhood Plans; and (10) Military Operations.

b. Circulation Element

The existing Circulation Element consists of four major sections. The first section provides background information on transportation and circulation, such as public transit, bicycle, vehicular transportation, aviation, and rail. The second section defines the classifications and standards for roadways, highways, expressways, and freeways. The next section describes the planned, programmed, and proposed improvements to the County's network over the next 20 years. Finally, the Circulation Element concludes with a section on goals and policies aimed at improving circulation in the County.

c. Housing Element

The County's 5th Cycle Housing Element was adopted on August 26, 2014, and covers the 2014-2022 planning period. The existing Housing Element reflects those components required for inclusion by State law, including both the Background Report and Policy Document. The Housing Element Background Report provides the background information and analysis to support the Policy Document, which includes goals, policies, and actions; a description of adequate site capacity to meet housing needs; quantified objectives for housing construction, conservation and rehabilitation; a description of public participation opportunities during the preparation of the updated Housing Element; and a description of the updated Housing Element's consistency with the other elements of the General Plan.

d. Economic Development Element

The existing Economic Development Element consists of two major sections. The first section provides background information on the economic sector, employment trends, and fiscal health. The second section establishes policies to achieve three main goals: (1) improve the local economy by diversifying the economy, reducing the unemployment rate, increasing business revenues to the County, and increasing wages; (2) promote and support the local agricultural economic sector; and (3) improve the County's fiscal health.

e. Water Resources Element

The existing Water Resources Element addresses water supply and quality, stormwater management, and water service in the County. It provides policy recommendations to protect, restore, and maintain water resources. The background section provides a brief overview of the existing water demand and supply in the county and a description on how they are currently managed. The second section establishes goals, policies, and actions to enhance water supply, manage groundwater resources, protect water quality, and improve streambank stability.

f. Conservation and Open Space Element

The existing Conservation and Open Space Element addresses nine topical areas, with a discussion of policy recommendations for each issue. The nine areas include (1) Greenhouse Gases, (2) Energy, (3) Air Quality, (4) Biological Resources, (5) Timber Resources, (6) Mineral and Soil Resources, (7) Military Installations, (8) Cultural Resources, and (9) Scenic Resources. Each topical area includes a background information section and a section covering the goals, policies, and actions aimed at providing guidance to the County on decisions that affect the resources included in this element.

g. Health and Safety Element

The existing Health and Safety Element focuses on protecting the community from natural and humanmade hazards. It addresses seven topical areas and provides policy recommendations for each issue. The seven areas are (1) Noise, (2) Flood Hazards and Dam Inundation, (3) Seismic and Geologic Hazards, (4) Fire Hazards, (5) Hazardous Materials, (6) Emergency Response and Disaster Preparedness, and (7) Community Health. Each topical area includes a background information section and a section covering the goals, policies, and actions aimed at reducing risks to health and property from natural and humanmade hazards.

h. Public Facilities and Services Element

The existing Public Facilities and Services Element addresses eight topical areas, with a discussion of policy recommendations for each issue. The nine areas are (1) General Government Services, (2) Fire Protection and Emergency Medical Services, (3) Sheriff Services, (4) Public Education, (5) Libraries, (6) Parks and Recreation, (7) Solid Waste and Waste Diversion, and (8) Wastewater. Each topical area includes a background information section and a section covering the goals, policies, and actions aimed at providing guidance to the County on decisions that affect public facilities and services.

i. Area and Neighborhood Plans Element

The existing Area and Neighborhood Plans Element carries forward policies from the prior Durham Dayton Nelson Area Plan and the Chapman/Mulberry Neighborhood Plan. The Durham Dayton Nelson section includes an urban reserve policy to balance residential and agricultural uses. The policy recommendations for the Chapman/Mulberry neighborhood were intended to promote revitalization of the neighborhoods and to enhance the single-family residential character of the plan area. In 2020, the City of Chico annexed the Chapman/Mulberry Neighborhood Plan area.

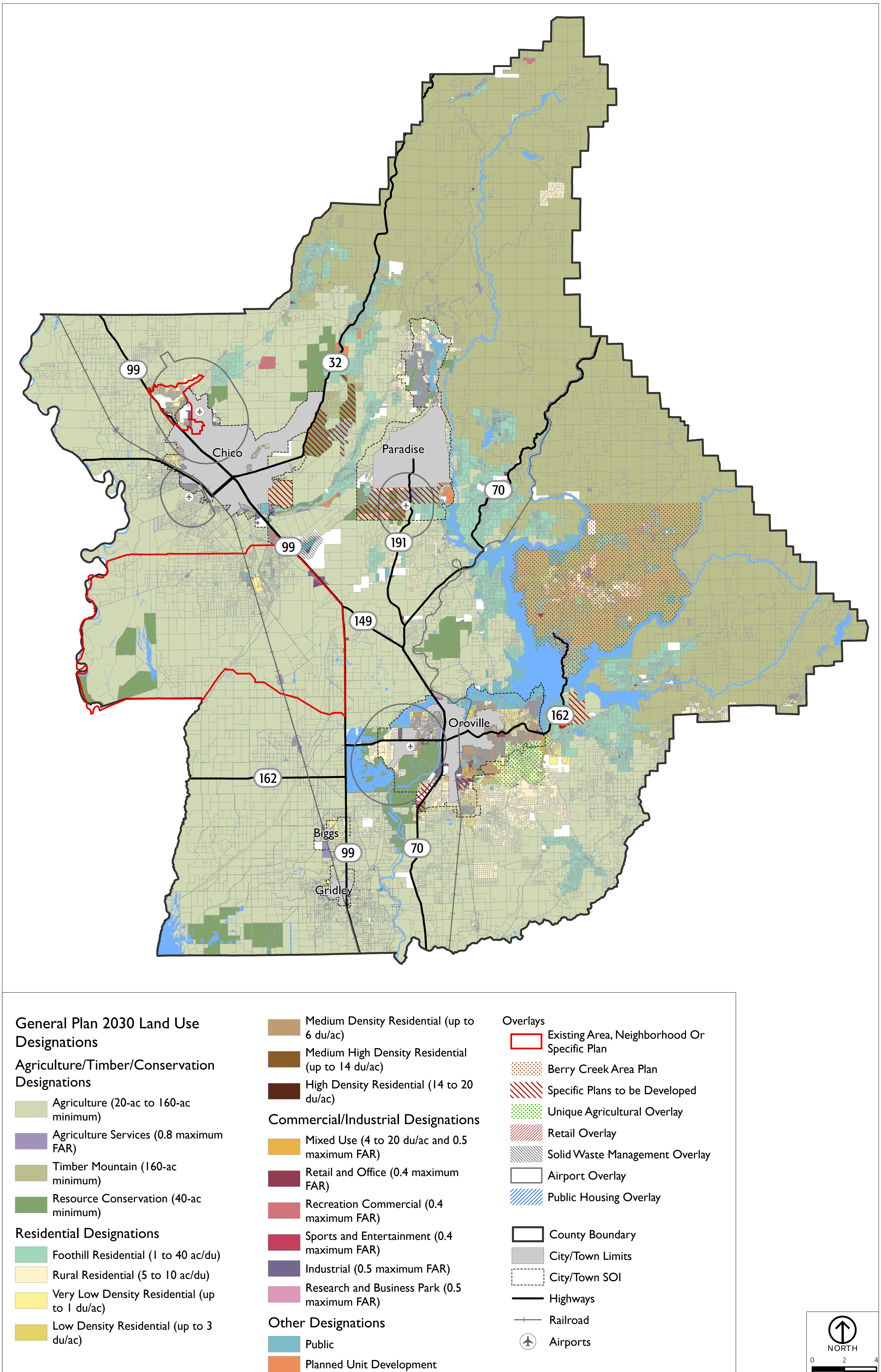
j. Agriculture Element

The existing Agriculture Element consists of two major sections. The first section provides background information on agricultural resources in the county. The second section establishes policies to maintain, protect, promote, and enhance agricultural resources and uses in the county. The Agricultural Element reflects the County's commitment to strategies that ensure continued agricultural productivity unhindered by development pressures. The primary method the County uses to meet their agricultural preservation goals is through policy measures. The California Land Conservation Act, better known as the Williamson Act, has been particularly successful in Butte County and statewide. The Williamson Act preserves agricultural and open space lands through property tax incentives and voluntary restrictive use contracts. According to the County's GIS database, the County had approximately 215,700 acres enrolled in Williamson Act contracts in 2016. This program will continue to be used, in addition to other policy tools, such as the Chico Area Greenline. Refer to Chapter 18, Agriculture, for a complete discussion of this topic.

2. Existing General Plan Land Use Categories

The existing Land Use Element sets forth 20 land use categories or designations that are applied to unincorporated areas of the county, as shown on the County's *General Plan Land Use Map* and indicated in Figure 1-1. As shown in the figure, most of the eastern third of the county is designated for Timber-Mountain uses. The western part of the county and most of the unincorporated area in the central part of the county is designated as Agriculture. Each municipality has adopted a land use and circulation plan for their incorporated lands and for their planning area.

For each land use category, the Land Use Element describes applicable principles and standards, including primary and secondary uses (i.e., other uses that are similar, compatible with, or necessary to the primary use), site designation criteria (i.e., preferred site attributes for that category), and intensity of use (i.e., limitations on parcel size, residential densities, and other factors). Table 1-1 lists the 20 land use categories in the existing Land Use Element, along with the primary allowable land uses for each designation.



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-1
BUTTE COUNTY GENERAL PLAN LAND USE DESIGNATIONS

TABLE 1-1 SUMMARY OF EXISTING LAND USE DESIGNATIONS

Land Use Designation	Primary Land Uses
Agriculture	Cultivation, harvest, storage, processing, and sale and distribution of all plant crops, especially annual food crops.
Agricultural Services	Cultivation, harvest, storage, processing, sale and distribution of all plant crops, and industrial uses, such as processing facilities.
Timber Mountain	Forest management and the harvesting and processing of forest products.
Resource Conservation	Natural, wilderness, and study areas and limited recreational and commercial recreational uses.
Foothill Residential	Single-family dwellings at rural densities.
Rural Residential	Single-family dwellings at rural densities.
Very Low-Density Residential	Detached single-family dwellings at low urban densities.
Low-Density Residential	Detached single-family dwellings at urban densities.
Medium-Density Residential	Detached and attached single-family dwellings at urban densities.
Medium High-Density Residential	A mixture of urban residential uses, including detached and attached single-family homes, duplexes, townhomes, condominiums, multiple-dwelling structures, and care homes.
High-Density Residential	Higher-density urban residential uses, including townhomes, condominiums, multiple-dwelling structures, mobile home parks, group quarters and care homes.
Very High-Density Residential	Very high-density urban residential uses, including townhomes, condominiums, multiple-dwelling structures, mobile home parks, group quarters, and care homes.
Mixed-Use	Mixed-use buildings and single use residential, retail, or office buildings in close proximity to each other.
Retail and Office	Structures and activities providing a full range of merchandise and services to the general public, including professional/office uses.
Recreation Commercial	Recreation and tourism-related uses, including golf courses, shooting ranges, archery ranges, eating and drinking establishments, wedding facilities, gasoline service stations, public buildings, hotels and motels, owner-occupied residences, RV parks, resorts, and vacation cabins.
Sports and Entertainment	Sports and entertainment uses as a primary use, including sports facilities, golf courses, theaters, and amphitheaters, as well as a range of related commercial uses that are compatible with the primary uses, including localized retail, commercial retail, and service establishments.
Industrial	Processing, manufacturing, packaging, storage and distribution of goods and commodities.
Research and Business Park	Allowable uses are narrowly defined to assure compatibility between uses. Industrial uses are limited to those manufacturers engaged in the production of low volume, high value products, particularly advanced technology products. Businesses requiring outdoor production and storage are prohibited. Following is a partial, representative listing of the primary permitted uses: 1. High and advanced technology, research and development uses, laboratories, including university-based research, and facilities used for testing and analysis of products or uses. 2. Business and professional corporate headquarters, regional offices, and data processing facilities. 3. Uses that emphasize product development over high-volume production in order to minimize traffic associated with the transportation of raw materials and products, and other nuisance factors.

Land Use Designation	Primary Land Uses
Public	Large facilities owned and operated by government agencies, including schools, colleges, airports, dams and reservoirs, disposal sites, recreation facilities, conservation areas, fire stations and other government buildings and property.
Planned Unit Development	Identifies future developments that will be considered under a Planned Unit Development application. The intent of this designation is to encourage and take advantage of opportunities for more integrated, flexible and superior design than is available through the application of conventional regulation.

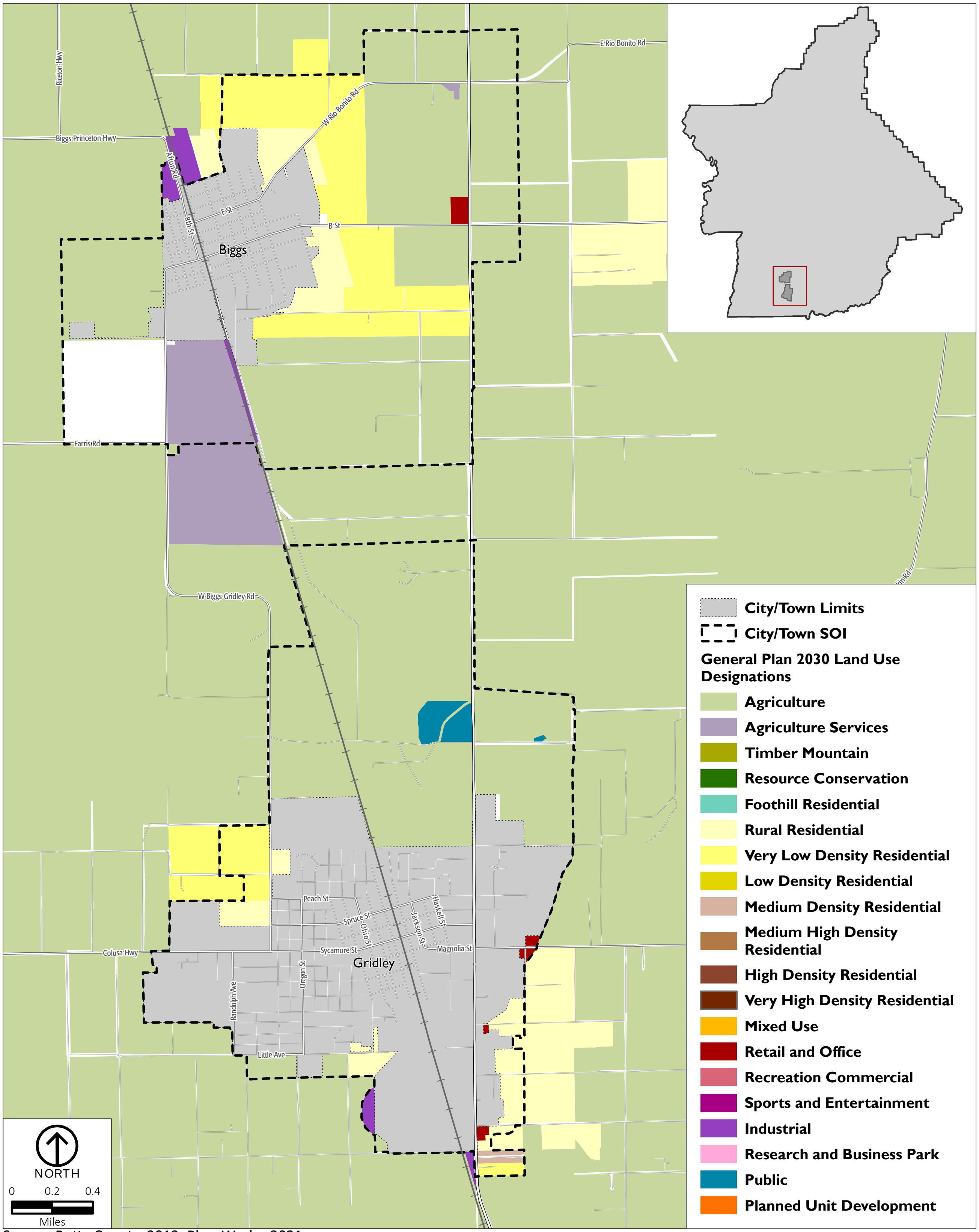
3. Relationship to Municipal General Plans

The existing General Plan is applicable to all unincorporated land in the county, including the areas within the Spheres of Influence of each of the county's five municipalities of Biggs, Chico, Gridley, Oroville, and Paradise. County General Plan policies and land use designations also need to consider the adopted general plans for these incorporated areas.

For development proposals within City and Town limits, the applicable municipal general plan takes precedence over any County General Plan provisions. Development proposals outside a municipality's boundaries, but within its SOI, should be reviewed by both County and municipal planning agencies for conformity with existing general plan policies. If a development proposal within a municipality's SOI would require municipal services (e.g., sewer and water), compliance with municipal general plan provisions is usually required. However, the annexation of properties outside municipal limits or the extension of sewer service outside the Urban Service Area (USA) requires approval by the Butte County Local Agency Formation Commission (LAFCO). USAs are areas where urban services will be provided and outside of which services will not be provided. As of 2021, USAs in Butte County include the Thermalito Water & Service District, Lake Oroville Public Utility District, South Feather Water & Power, and California Water Service Company.[1]

Figures 1-2 through 1-5 display the County General Plan designations within and adjacent to each municipality's SOI. Additional information concerning these SOIs, the regulation of SOIs, and the role of LAFCO, is provided in Section I.D of this chapter. These boundaries are regularly evaluated by each municipality in conjunction with a Municipal Services Review by LAFCO.

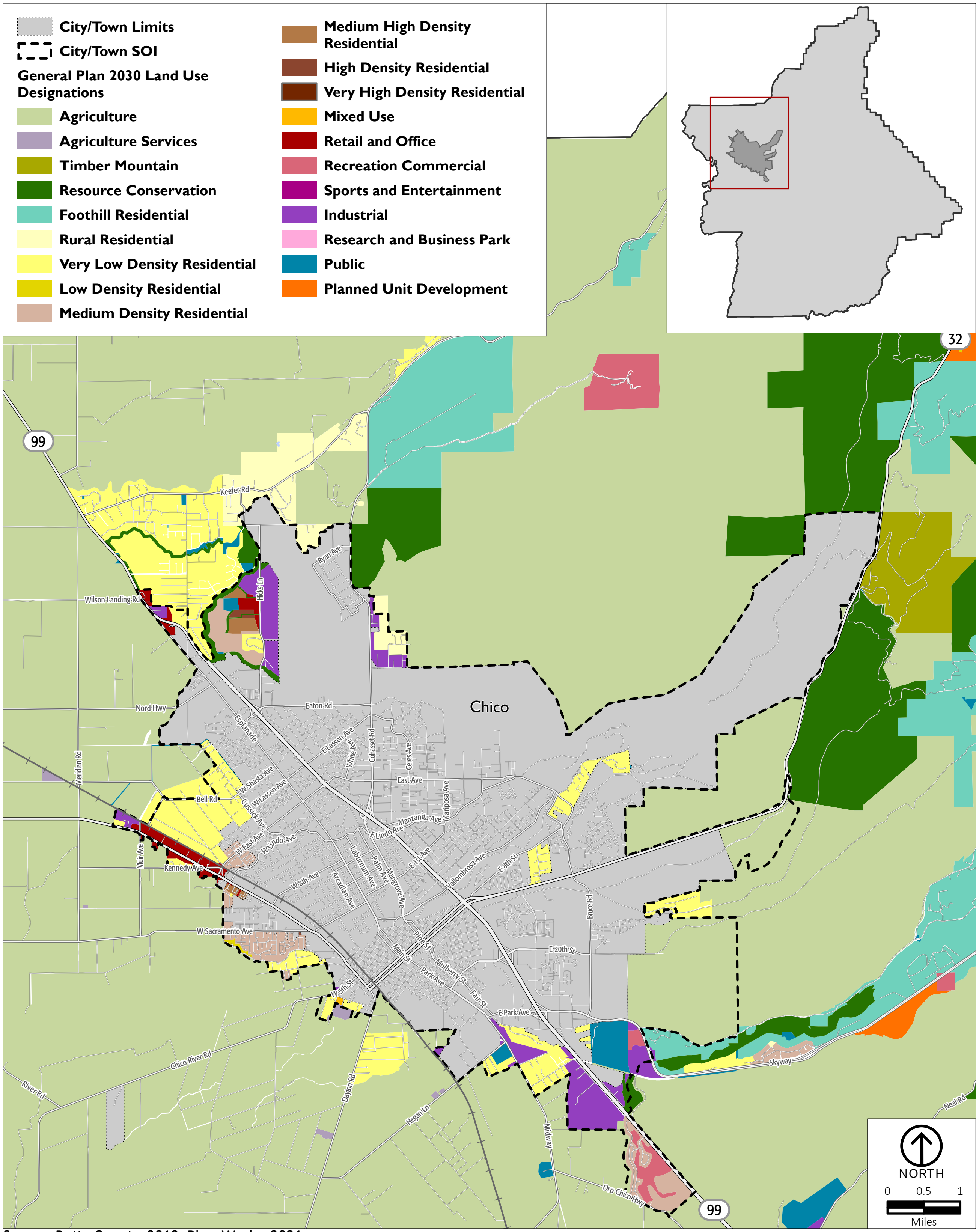
[1] Mark Michelena. Senior Planner, Department of Development Services, Butte County. Personal communication with Andrea Howard, PlaceWorks. February 4, 2021.



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-2

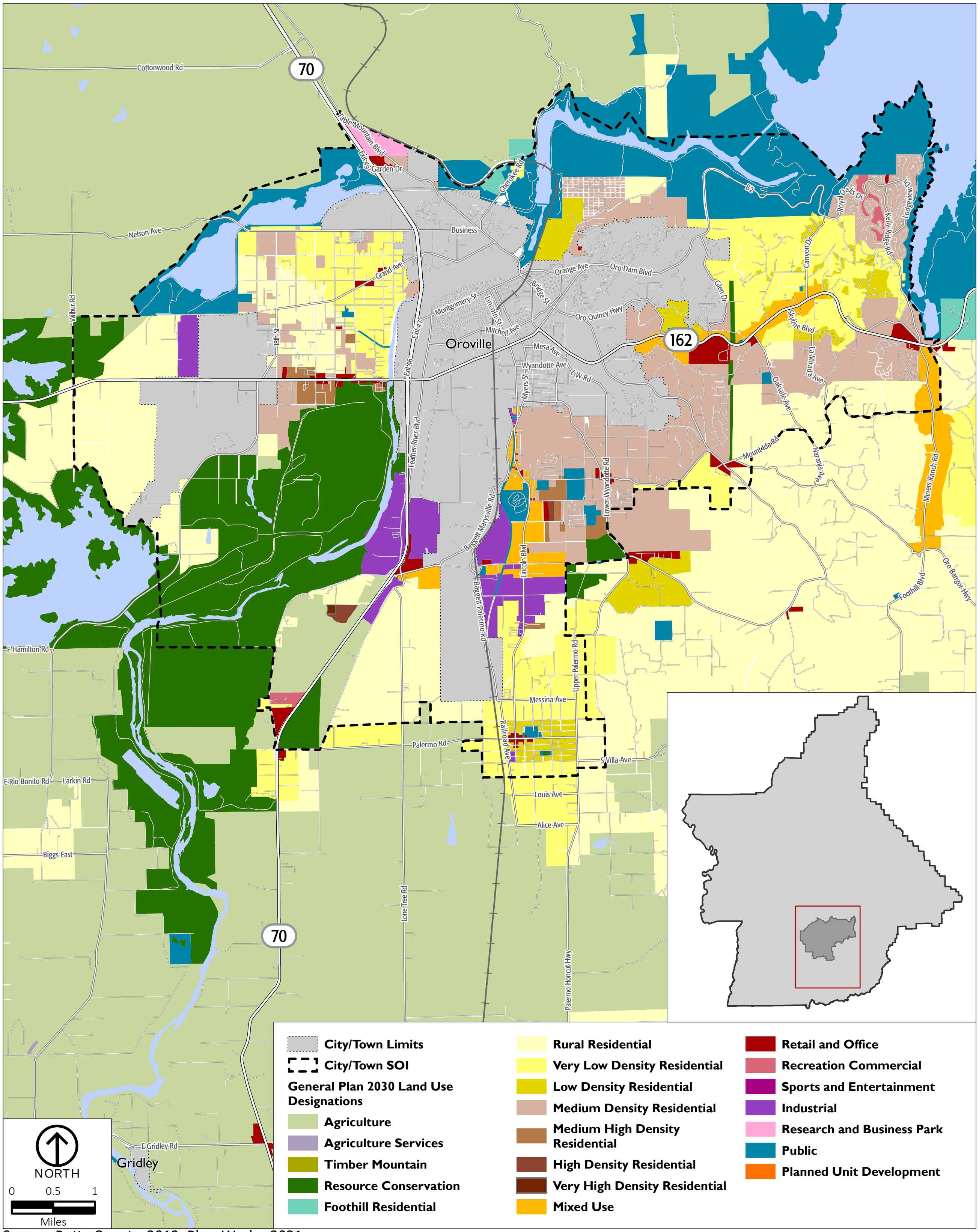
BIGGS AND GRIDLEY SPHERES OF INFLUENCE



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-3

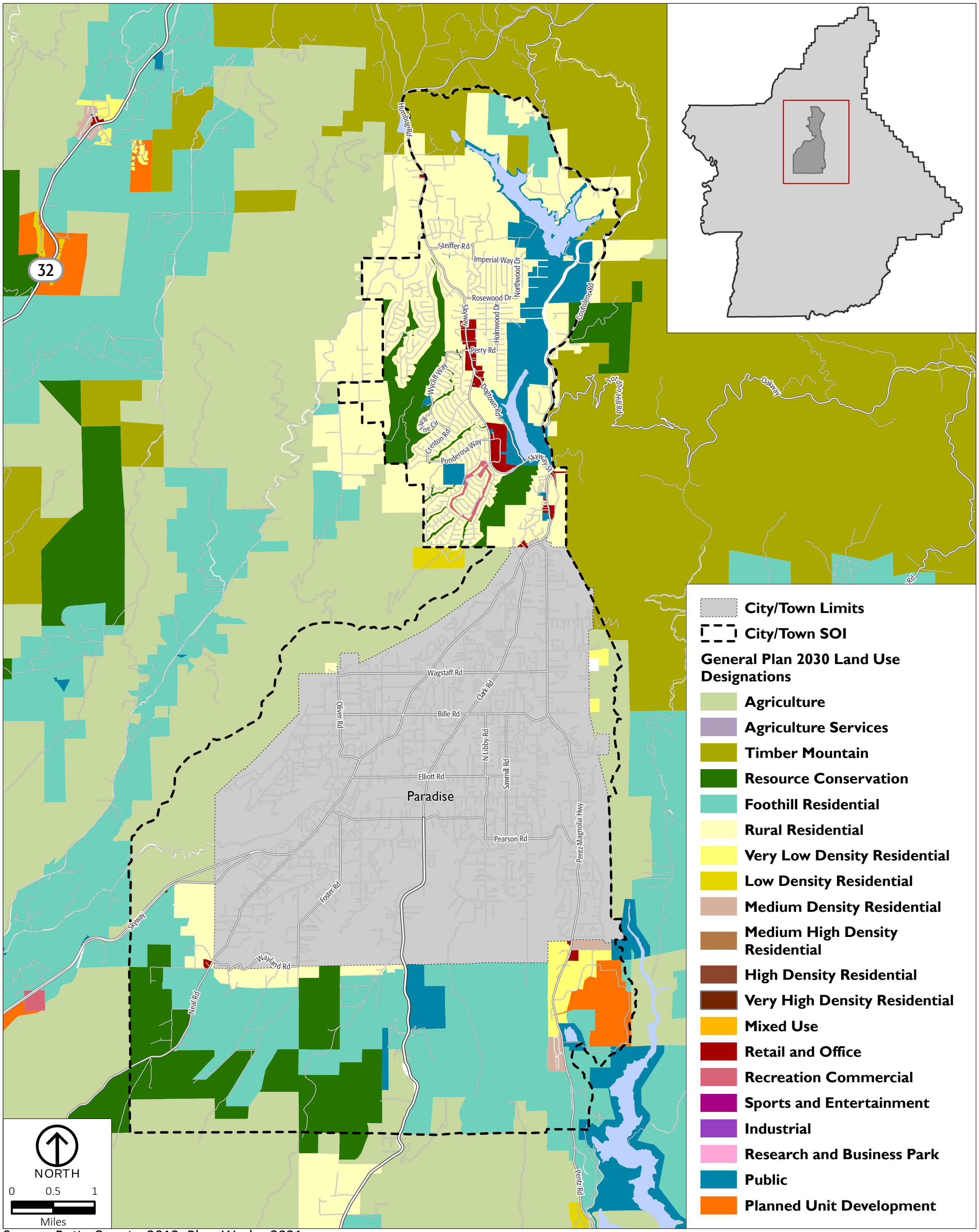
CHICO SPHERE OF INFLUENCE



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-4

OROVILLE SPHERE OF INFLUENCE



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-5
PARADISE SPHERE OF INFLUENCE

4. Specific, Area, and Neighborhood Plans

Specific, area, and neighborhood plans are tools that can be used to guide growth and development in designated geographic areas. A specific plan is fundamentally a tool for the "systematic implementation" of a general plan, typically within a defined area. Because the general plan must address policy issues on a broad scale throughout the agency's jurisdiction, it lacks specificity to deal with the needs of a smaller area. Although the specific plan must be consistent with the general plan, it can address infrastructure, land use and financial issues in a more appropriately focused and detailed manner. Area and neighborhood plans provide extra detail beyond what the General Plan was designed to accomplish and provide more specific direction to these various planning areas.

There are three specific plans in Butte County: the *Stringtown Mountain Specific Plan,* the *North Chico Specific Plan*, and the *Rio d'Oro Specific Plan*. In the 1980s and 1990s, Butte County adopted a number of area plans and one neighborhood plan. Most policy guidance from those area plans was incorporated throughout the 2030 General Plan. Specific policy guidance from the *Durham-Dayton-Nelson Area Plan* was incorporated into a discrete chapter of the General Plan: Chapter 13, Area and Neighborhood Plans Element. Currently, the *Durham-Dayton-Nelson Area Plan* is the only area plan in Butte County. In addition to these existing plans, the County is currently in the process of preparing the *Upper Ridge Community Plan*. All current and pending plans are described below.

a. Stringtown Mountain Specific Plan

The Stringtown Mountain Specific Plan, adopted September 1994, addresses design criteria and development standards for the future development of a health resort and residential community in the foothills east of Oroville, at Highway 162 and Forbestown Road. Figure 1-6 maps the Stringtown Mountain Specific Plan area. The development foreseen in the Specific Plan has encountered obstacles to its implementation, primarily due to issues of with provision of sewer service.

b. North Chico Specific Plan

The North Chico Specific Plan was adopted in January 1995. The plan area, which is mapped in Figure 1-7, encompasses 3,590 acres bounded by Sycamore Creek to the south, Highway 99 to the west, Rock Creek to the north and Chico Municipal Airport to the east. The Specific Plan allows for the development of 2,803 residential dwelling units at varying densities. The purpose of this plan is to comprehensively respond to development proposals and incorporate them into a concept for land use for the area, while evaluating and providing for area-wide solutions to drainage, circulation, and public services. The County is currently in the process of amending the Specific Plan to guide development of the North Chico Village site located within the plan area.

c. Rio d'Oro Specific Plan

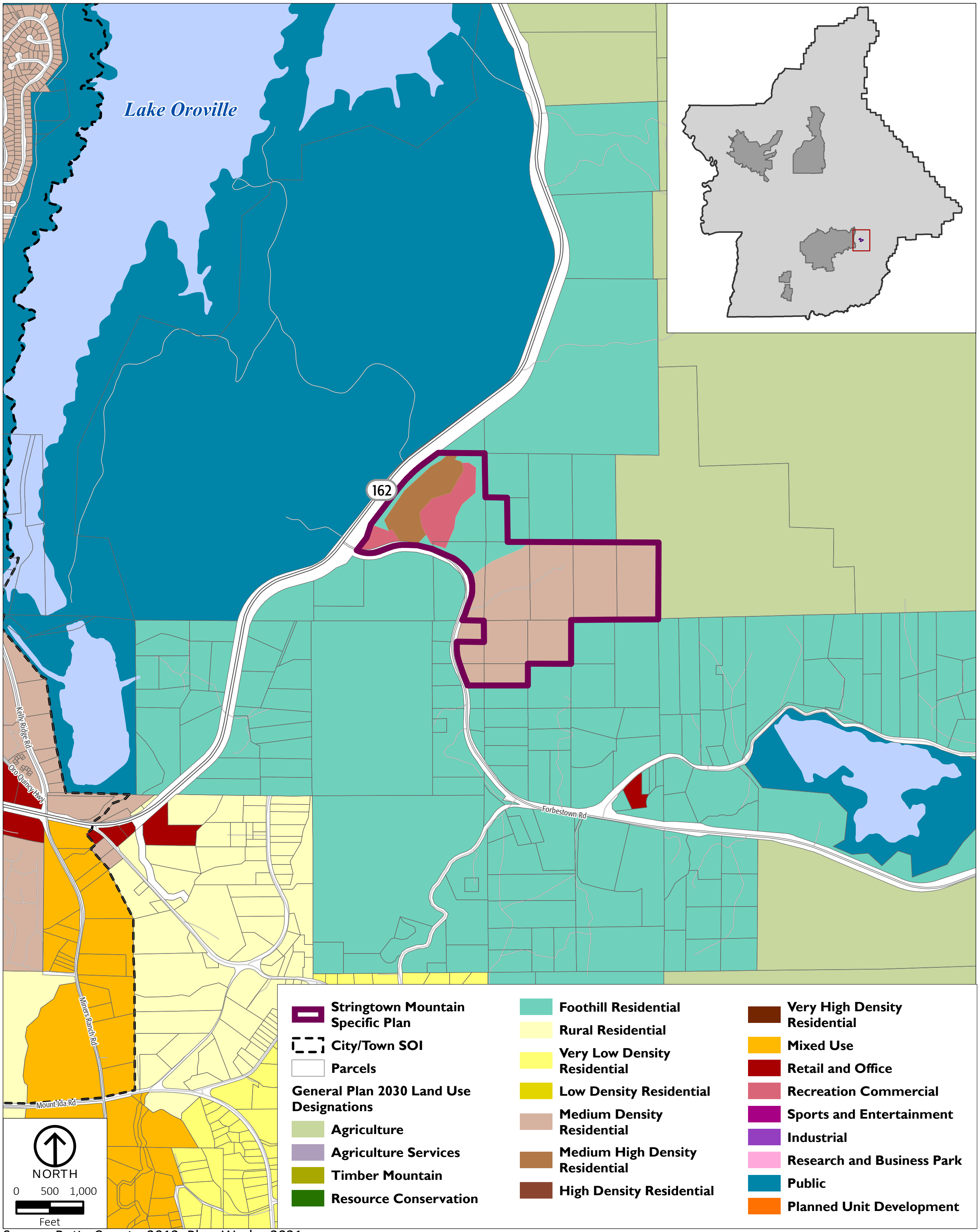
The Rio d'Oro Specific Plan was adopted in May 2015 and encompasses approximately 689 acres located along State Route 70 south of Oroville, 276 acres of which are dedicated to environmental conservation and scenic open space. The Rio d'Oro Specific Plan area is shown in Figure 1-8. The Specific Plan limits development to no more than 2,700 dwelling units of mixed residential types and 30 acres of retail and office uses along the northern portion of the Specific Plan. Smaller areas are planned for public and commercial uses in the southeast portion of the plan area at State Route 70 and Palermo Road. There are additional steps that need to be completed before development of the Rio d'Oro Specific Plan can occur. Although the northern central portion of the Specific Plan area is already zoned for high-density residential and such development is permitted by right, sewer, water, and power access are needed prior to development. Prior to developing the remaining area, the following steps are required: a General Plan amendment and rezone, an ordinance that sets specific development standards for the area, some land acquisition, a development agreement negotiation process, and a fiscal analysis.

d. Upper Ridge Community Plan

The Upper Ridge Community Plan is currently under development. The Community Plan will set a vision and provide policy guidance for the Upper Ridge communities north of the Town of Paradise, as shown in Figure 1-9. The purpose of this Community Plan is to support recovery and rebuilding efforts from the Camp Fire and foster resilient and thriving communities.

e. Durham-Dayton-Nelson Area Plan

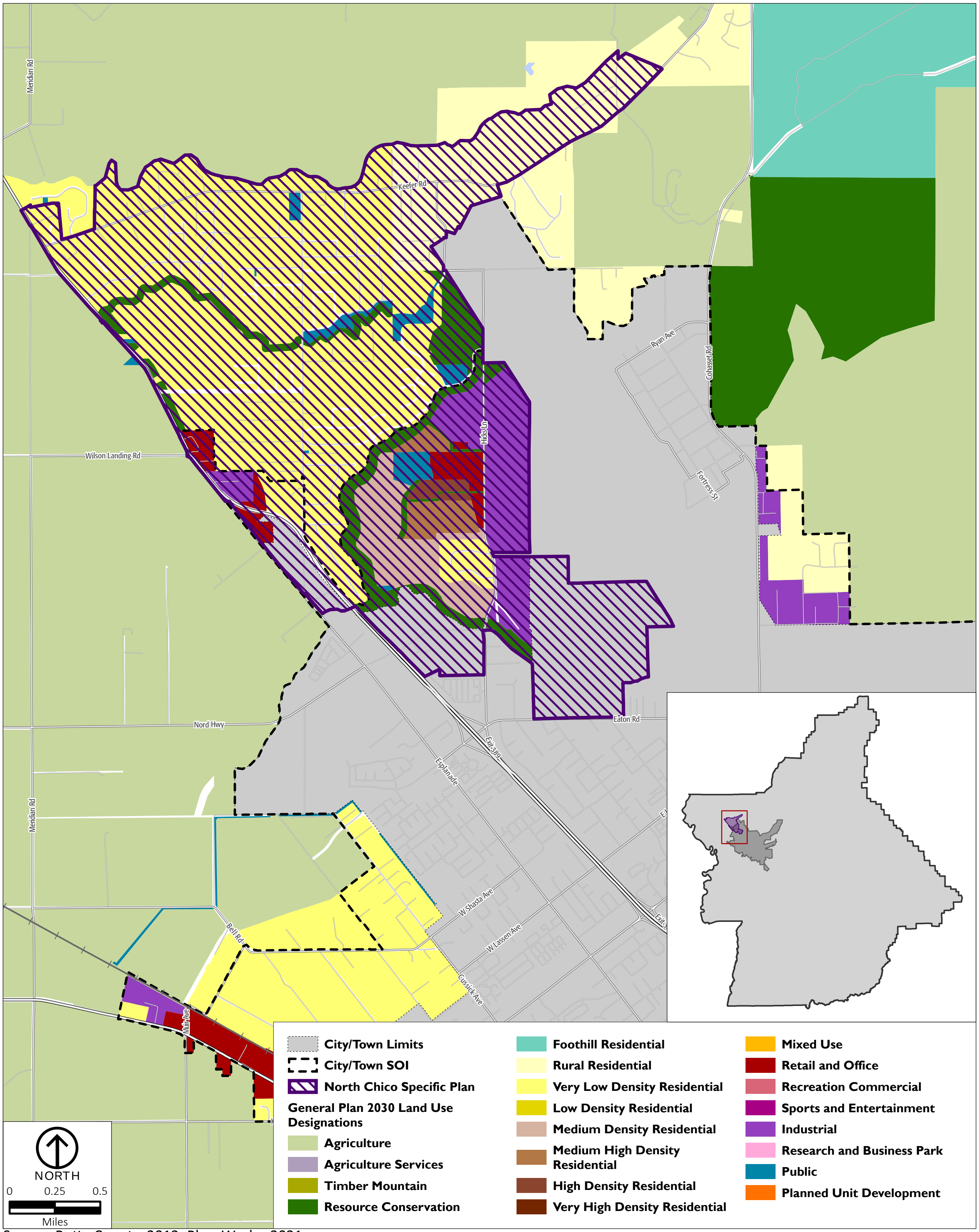
The Durham-Dayton-Nelson Area Plan was adopted in 1992, covering the unincorporated communities of Durham, Dayton, and Nelson in west-central Butte County, as shown in Figure 1-10. The Area Plan establishes land use policies and designates the planning area as an urban reserve. Policies for the area include a restriction on rural residential development to parcels of three acres or more, until such time as it is determined the area is "needed for development," and adequate services are available to serve that development.



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-6

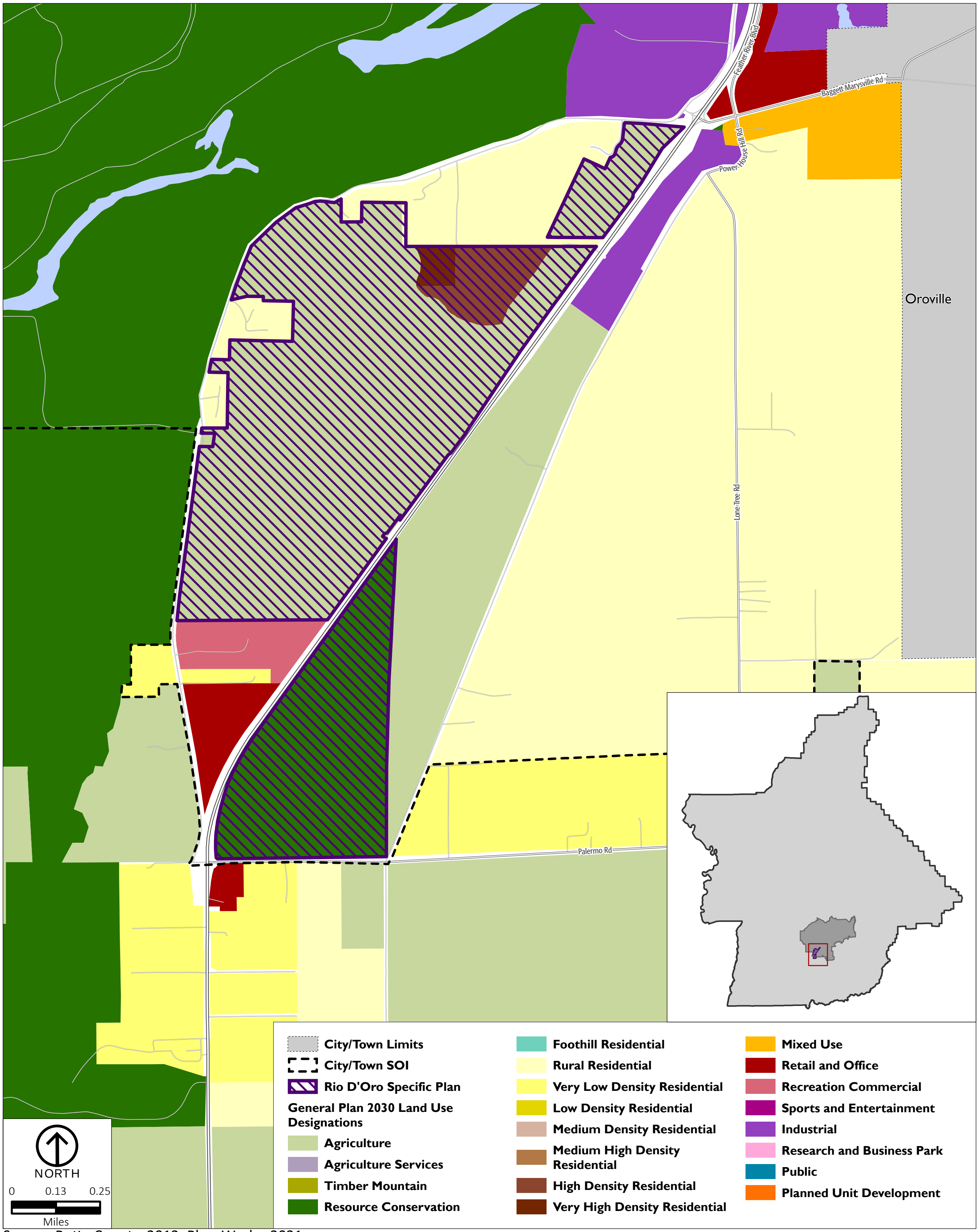
STRINGTOWN MOUNTAIN SPECIFIC PLAN



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-7

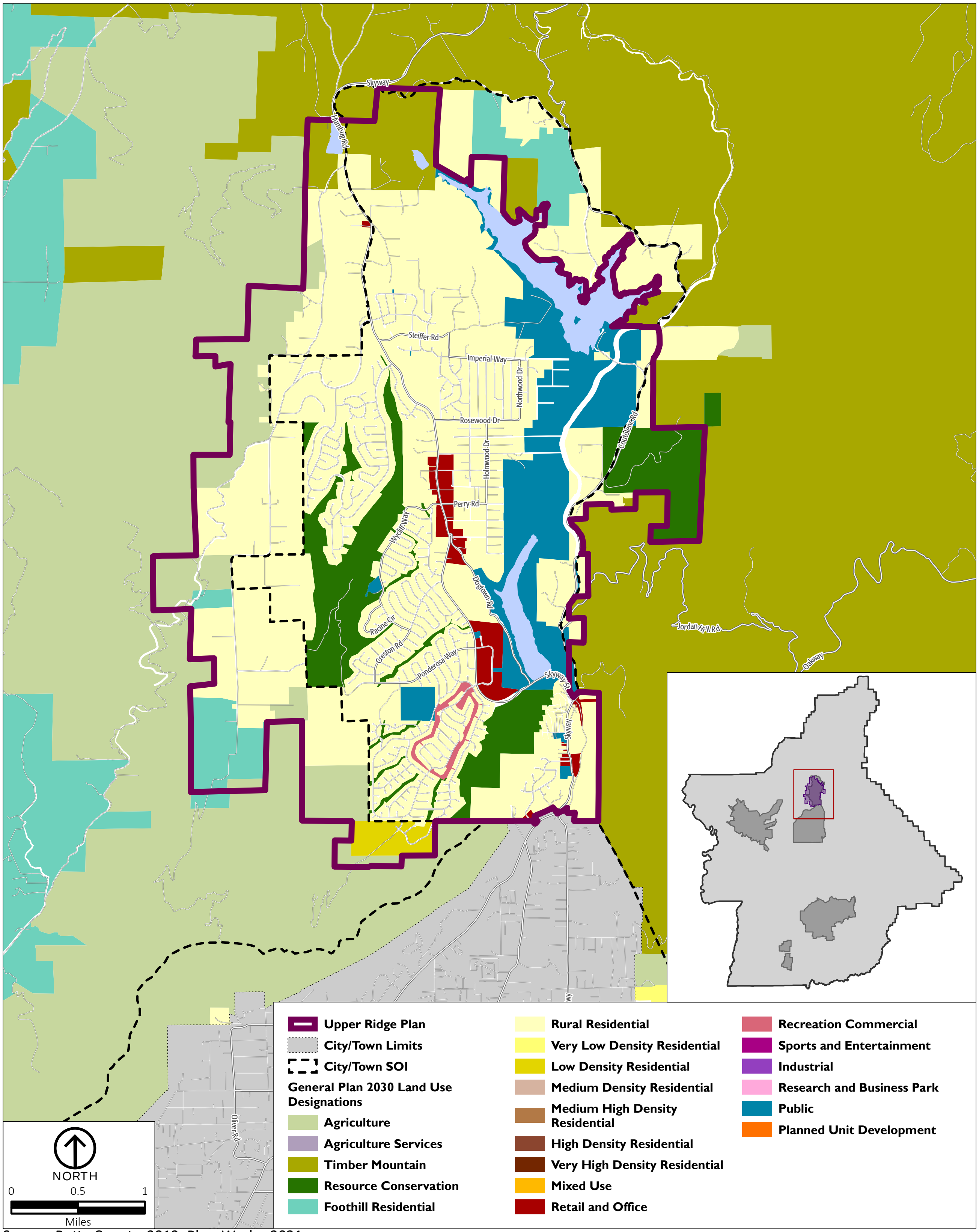
NORTH CHICO SPECIFIC PLAN



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-8

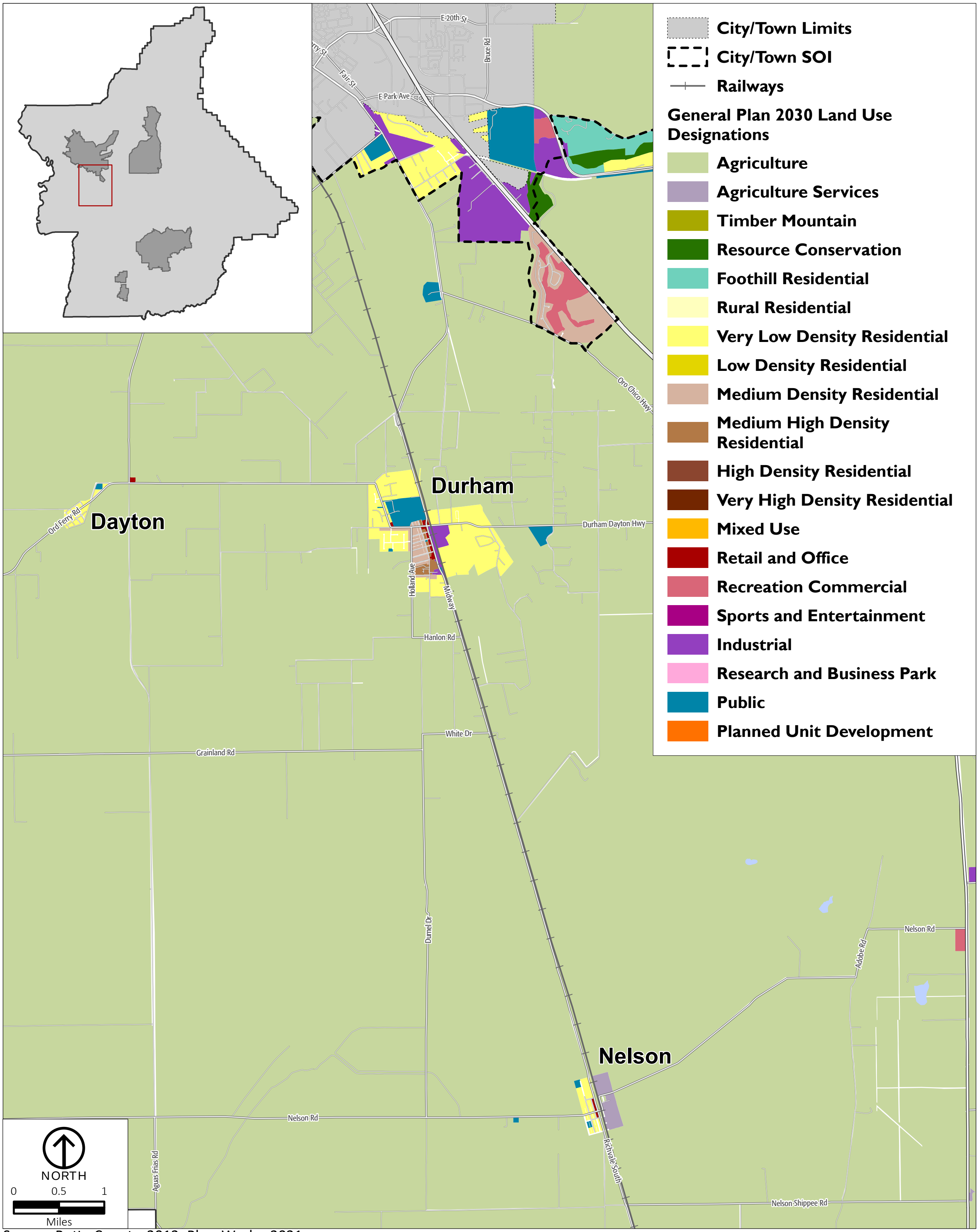
RIO D'ORO SPECIFIC PLAN



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-9

UPPER RIDGE COMMUNITY PLAN



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-10

DURHAM, DAYTON AND NELSON AREA

B. Zoning

The *Butte County Zoning Ordinance*, adopted November 2012, sets forth zoning regulations for the unincorporated areas of the county. The Zoning Ordinance regulates land uses, building heights, setbacks, provision of open space, and other factors that relate to development on individual properties.

Under State law, cities and counties have broad latitude in establishing zoning standards and procedures. One key requirement, however, is that zoning regulations shall be consistent with the general plan.

1. Summary of Zoning Districts

The Butte County Zoning Ordinance establishes a total of 41 zoning districts. There are also 16 overlay zoning districts that provide additional standards to specified areas in the county.

The following is a brief summary of the zoning categories. This summary outlines only general standards; the Zoning Ordinance itself should be consulted for specific details regarding permitted, accessory and conditional uses, and other regulations.

a. Agricultural Zones (AS, A-20, A-40, A-80, A-160)

These zones provide for agricultural uses with minimum lot areas of 20, 40, 80, and 160 acres, respectively. Permitted uses include one single-family dwelling per parcel, agricultural uses, and housing facilities for agricultural employees. Minimum lot acreages correspond to the suffix of the A zone; for example, the minimum lot size in the A-20 zone is 20 acres. The Agricultural Service (AS) zone does not permit residential uses, except for caretaker quarters as an accessory use. Other permitted uses in the AS zone include animal grazing, crop cultivation, and agricultural processing. The minimum lot area in the AS zone is 20,000 square feet.

b. Natural Resource Zones (TM, TPZ, RC)

The Natural Resource zones protect Butte County's valuable timber resources and preserve the natural, wilderness, and scientific study areas that are critical to the environmental quality. These zones permit one single-family dwelling per parcel, animal grazing, and private stables. Timber processing, forestry, and logging are permitted uses in the Timber Mountain (TM) and Timber Production (TPZ) zones.

c. Foothill and Rural Residential Zones (FR-1, FR-2, FR-5, FR-10, FR-20, FR-40, FCR-20, RR-5, RR-10, RCR-10)

The Foothill Residential (FR) and Rural Residential (RR) zones permit large lot single-family dwellings and small farmsteads in the foothill and agricultural areas of the county. Animal grazing, crop cultivation, private stables, on-site agricultural product sales, and other similar agricultural activities are also permitted uses in these zones. The suffix of each FR and RR zone specifies the minimum lot area in acres.

d. Residential Zones (VLDR, VLDR-2.5, VLDCR, LDR, MDR, MHDR, HDR, VHDR)

These zones permit residential uses at varying densities. The highest residential density permitted is 30 dwelling units per acre, in the VHDR zone. Permitted uses in the VLDR and VLDCR zones include single-family homes, small residential care homes, accessory dwelling units, animal grazing, on-site agricultural product sales, and private stables. The LDR and MDR zones permit single-family homes, second units, and accessory dwelling units.

The MHDR, HDR, and VHDR zones allow a mixture of housing types at medium and high densities. Permitted housing types include single-family homes, duplex homes, multifamily dwellings, second units, and accessory dwelling units.

e. Commercial and Mixed-Use Zones (G-C, C-C, N-C, REC, S-E, MU-1, MU-2, MU-3)

These zones (General Commercial, Community Commercial, Neighborhood Commercial, Recreation Commercial, Sports and Entertainment, and Mixed-Use, respectively) allow various types of retail and other commercial uses. Except for the REC and S-E zones, these zones also permit or conditionally allow specified types of residential uses. The S-E zone is intended primarily for sports and entertainment uses, such as sports facilities, theaters, and golf courses. The REC zone is intended exclusively for unique recreation and tourism-related uses; caretaker units, as an accessory use, are permitted in this zone.

f. Research and Business Park Zone (RBP)

The RBP zone is initiated on a case-by-case basis by a property owner. Primary uses in this zone include research and development, business and professional corporate headquarters, and light industrial and manufacturing geared toward high and advanced technology. Site development standards include extensive landscaping, open space, and recreational opportunities. The RBP zone is currently applied in one location north of Oroville.

g. Industrial Zones (L-I, G-I, H-I)

These zoning districts (Light Industrial, General Industrial, and Heavy Industrial) permit varying intensities of manufacturing uses (including assembly, processing, fabricating, refining, repairing, packaging, and treatment), as well as warehouse storage and distribution.

h. Other Zones (PB, AIR, PD, Overlay Zones))

The PB (Public) zone allows public and quasi-public facilities to serve Butte County residents. Permitted uses in the PB zone include public and private schools, parks and playgrounds, community centers, government offices, and police and fire stations.

The AIR (Airport) zone is intended exclusively for Butte County's airports and permits uses typically associated with airport operations. It allows unscheduled air carrier facilities, charter aircraft operations, aircraft storage, and other similar uses. Retail, services, and restaurant uses are conditionally permitted.

The PD (Planned Development) zone is intended to promote creativity in building design and allow for high-quality development that deviates from applicable standards. It allows diversification in land uses, structures, lot sizes and open spaces, consistent with the General Plan and subject to County approval of a land use and development plan for the site.

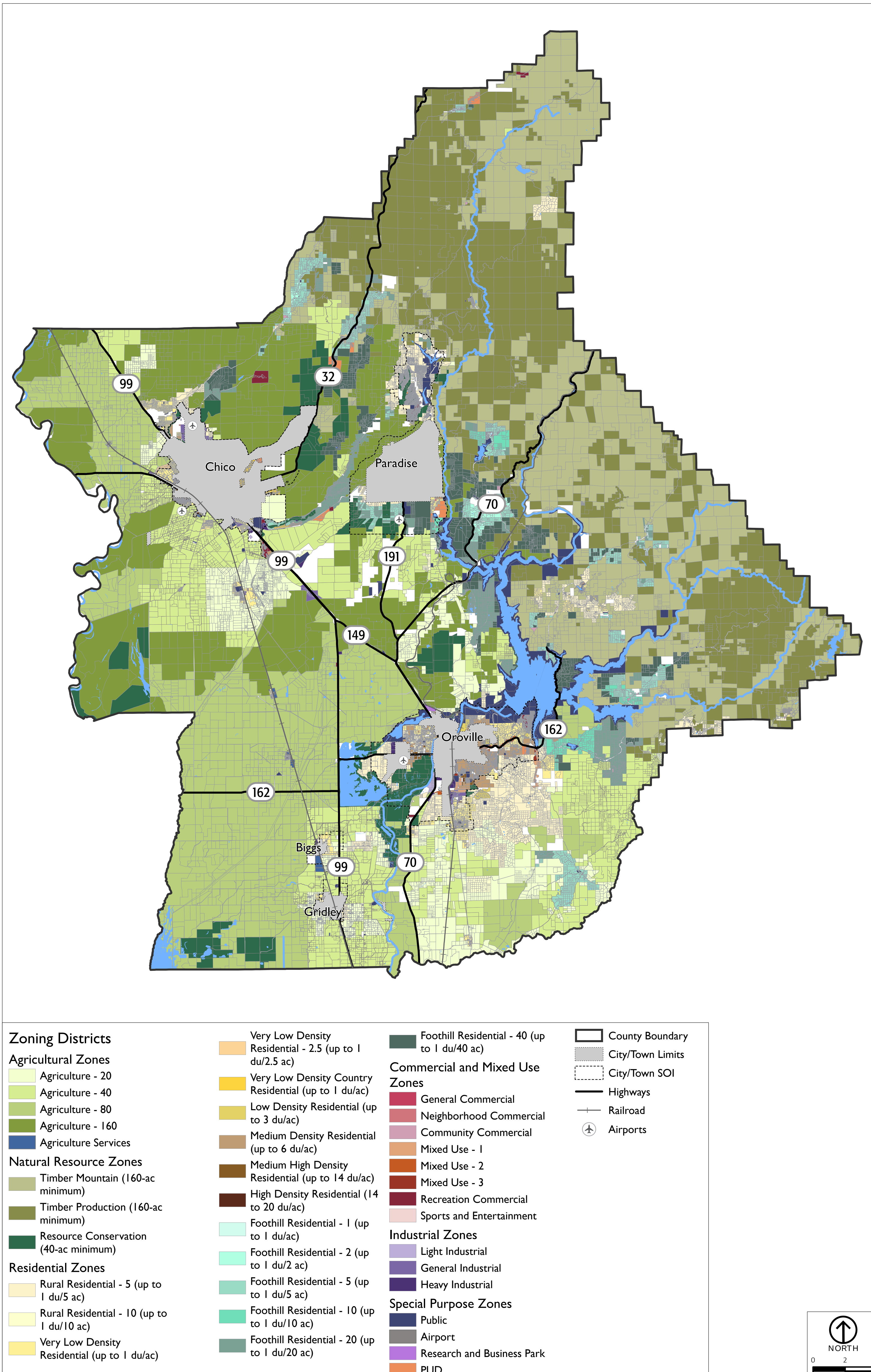
There are many overlay zones that establish regulations in addition to the underlying base zone requirement. Examples of existing overlay zones include the Airport Compatibility Overlay Zone, Butte Creek Canyon Overlay Zone, Deer Herd Migration Overlay Zone, Public Housing Overlay Zone, and the Scenic Highway Overlay Zone. Whenever a conflict exists between the overlay zone and base zone, the overlay zone requirement applies.

2. Summary of County Zoning Map

Figure 1-11 displays the countywide zoning map. The majority of the western third of the county is zoned for agricultural uses (A-20, A-40, A-80, A-160). Much of the eastern third of the county is zoned Timber-Mountain or Timber Production. Properties in the central portion of the county are predominantly zoned Foothill Country Residential and Agriculture. In the southern portion of the county, the zoning is mainly for agricultural uses (A-20, A-40, A-80).

Concentrations of residential, commercial, and industrial zoned properties are found adjoining the five incorporated municipalities. Lands immediately adjacent to Gridley, Biggs, and Paradise are generally zoned for less intense urban development (e.g., Foothill Residential in the Paradise area); however, some properties immediately adjacent to these municipalities are zoned for residential, commercial, and/or industrial uses.

A substantial amount of land immediately adjacent to Lake Oroville is zoned Resource Conservation. Several roadways in the county, including the Oroville Quincy Highway, Lumpkin Road, and Skyway, are in the Scenic Highway Overlay zoning designation.



Source: Butte County, 2012; PlaceWorks, 2021.

FIGURE 1-11
BUTTE COUNTY ZONING DISTRICTS

C. Municipal General Plans and Related Documents

Butte County contains five incorporated municipalities: Biggs, Chico, Gridley, Oroville, and Paradise. Each municipality has a General Plan to guide development within its limits and its larger planning area. The following discussion describes each municipality's size and character and briefly summarizes the provisions of its general plan, particularly those relevant to the Butte County General Plan and countywide land use and development issues.

1. City of Biggs

The City of Biggs is in the southwest portion of Butte County, approximately five miles north of the City of Gridley. Highway 99 runs in a north to south direction east of the city, and the Union Pacific Railroad extends through the center of the city.

The City of Biggs was founded in 1903 with the development of the area's agriculture and the construction of the California and Oregon Railway, now known as the Union Pacific Railroad. The growth of the city has hinged on agricultural development. Small fruit and field-crop farms and large rice-growing ranches presently occupy a major portion of the immediately surrounding area. The rice industry is a major influence on the community's economy. Local economic growth is tied to agricultural productivity and the demand for local goods and services, as prospects for non-agricultural development appear limited.

a. Population and Land Use Characteristics

Growth has been relatively slow in the City of Biggs: the city's population was 1,581 in 1990,[2] 1,793 in 2000, and 1,707 in 2010.[3] As of January 1, 2020, the city's population was estimated at 1,852,[4] representing an increase of less than 300 people over 30 years.

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[2] State of California, Department of Finance, August 2007, *E-8 Historical Population Estimates for Cities, Counties and the State, 1990-2000*.

[3] State of California, Department of Finance, November 2012, *E-8 Historical Population Estimates for Cities, Counties and the State, 2000-2010*.

[4] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark*.

According to Butte County Association of Governments (BCAG) post-Camp Fire projections, Biggs is anticipated to grow at about 1.3 percent annually between 2020 and 2045. To accommodate this growth, the city would need additional housing. Biggs 6th Cycle regional housing needs allocation (RHNA) is 81 housing units, which means the City's next Housing Element must plan to accommodate the development of 81 units over the eight year RHNA Cycle, covering the period of 2022 through 2030.[5]

Most of the incorporated land area in Biggs used for residential purposes and the remaining land is developed with employment-generating uses, commercial, or vacant land. Recent growth has involved primarily single-family home construction; there are no multifamily or mobile home parks in the city. Biggs has a small commercial core area that serves most daily needs of its residents, but most shopping for major items occurs in other population centers.

b. General Plan

The City of Biggs adopted its current General Plan in 2014. The General Plan covers a planning period from 2014 to 2030. The City's SOI boundary was greatly expanded to include the West Biggs Gridley Road Annexation No. 2 and two special study areas in 2016. There are currently no plans to update the 2014 General Plan.

The 2014 General Plan prescribes land uses for the area within the city limits and SOI. The General Plan states as a primary land use goal to "Maintain and promote the qualities which make Biggs a desirable community."[6] The City's Plan includes a list of policies and programs to achieve this goal, including the following:

- ♦ Ensure that individual development projects conform to the overall plan for the community and that consideration is given to the configuration of adjacent areas to be developed in the future.
- ♦ Adopt guidelines providing direction for the processing and consideration of amendments to the City's adopted Land Use Diagram.
    - o Following the adoption of the General Plan, undertake a comprehensive update to the City Municipal Code to coordinate General Plan and zoning requirements.

[5] Butte County Association of Governments, December 2020, *6th Cycle Regional Housing Needs Plan*, page 12.

[6] City of Biggs, 2014, *City of Biggs General Plan*, page LU-20.

    - Following the adoption of the General Plan and upon completion of the update of the City Municipal Code, revise zoning designations for specific parcels as necessary to achieve consistency between the General Plan and zoning designations in the city.

- Ensure that individual development projects conform to the community design vision of the General Plan and enhance and reinforce the positive attributes of the city.
    - Following the adoption of the General Plan, adopt a formal Design Review process including design standards and guidelines.
    - Prior to the adoption of a formal Design Review program, apply the Design Guidelines presented in the Community Enhancement Element when reviewing development projects.

- Require new development to promote the small-town character of Biggs through the use of site and building design elements.

- Promote high-quality, efficient, and cohesive land utilization that minimizes negative impacts and environmental hazards on adjacent neighborhoods and infrastructure and that preserves existing neighborhoods from encroachment by incompatible land uses.
    - Incorporate enhanced notification and public awareness requirements into the Zoning Ordinance to ensure that residents and landowners are aware of potential impacts to property from new development.
    - Actively work with landowners and project proponents to seek ways to minimize or mitigate project-related environmental hazards.

- Continue to promote the use of undeveloped land for active agricultural purposes by ensuring the new development does not unnecessarily or prematurely encroach or convert viable, productive, and active agricultural lands. Design criteria for buffers should be as follows: (1) require a minimum 100-foot-wide physical separation, which may include roadways, pedestrian/bicycle routes, storm water basins, canals and sloughs, and open spaces between the agricultural use and any habitable structure; (2) require the use of vegetative plantings to reduce issues related to dust, noise, aesthetics, and air quality; (3) where possible, minimize the use of structural features, such as barrier walls to mitigate land use incompatibilities.

- Update the City's Zoning Ordinance or include within a future design review program guidelines and standards for the buffering of incompatible land uses.

- ♦ Direct growth to areas having existing public facilities and services or to areas where new facilities and services can be provided in a manner that benefits the existing residents of the city.

2. City of Chico

The City of Chico is in the northwest part of Butte County, about 100 miles north of Sacramento and 70 miles south of Redding. The city is bisected by Highway 99, which runs in a north-south direction. Highway 32, which runs east-to-west, intersects Highway 99 near the center of Chico.

Founded in 1860 by John Bidwell, the City of Chico has grown from an individual rancho to the center of economic activity of the tri-county area, which includes Butte, Glenn, and Tehama counties. Chico is home to two regional malls and major discount retailers. Also, Chico is a major medical and education center servicing much of the entire northeastern part of California. Chico's Planning Area consists of approximately 150 square miles of land and includes the City of Chico, the City's SOI, and unincorporated areas in Butte County.

a. Population and Land Use Characteristics

As Butte County's largest urban community, Chico experienced a moderately slow and steady growth rate until 1960. The city grew rapidly during the 1960s and through the first half of the 1970s, largely due to increased student enrollment at California State University, Chico (CSUC). Additional growth during the period from 1970 to 1990 established the city as the retail, service, and medical center for the region. Since 1990, the city's population has continued to grow. According to California Department of Finance estimates, the city's population as of January 1, 2020, was 110,326.[7] The total population for Chico was estimated at 86,187 in 2010 and 60,516 in 2000.[8] In 1990, Chico's population was 39,970.[9]

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[7] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark*.

[8] State of California, Department of Finance, November 2012, *E-8 Historical Population Estimates for Cities, Counties and the State, 2000-2010.*

[9] State of California, Department of Finance, August 2007, *E-8 Historical Population Estimates for Cities, Counties and the State, 1990-2000.*

Chico is projected to grow about 0.45 percent annually between the years 2020 to 2045 according to BCAG post-Camp Fire projections. The 6th Cycle 2022-2030 RHNA for Chico is 3,488 housing units.[10]

Much of the residential land area in Chico is developed at low and medium residential densities. In 2007, the Chico City Council adopted a new mixed-use General Plan designation with the intention of creating more compact neighborhoods. The 2014 General Plan calls for a "range of housing types and densities within neighborhoods to expand the range of housing choices."[11]

Chico serves as a key regional center, since it is the largest city of its size within some distance and offers diverse commercial, service, and cultural opportunities, as well as the presence of a major California State University campus. The economy of the Chico area is based mainly on service and retail uses, the State University, and manufacturing. The city provides the most fully developed retail-commercial area in the county.

In the non-urban part of the area surrounding Chico, the predominant land use on the valley floor is agriculture, including a variety of crops. Prime agricultural soils are found on the valley floor on the west side of the city. Generally, soils to the east of the city are suitable only for seasonal grazing. In the foothill areas, the predominant uses are low-density housing, marginal agricultural activity, and recreation/open space.

b. General Plan

The *City of Chico General Plan* was updated in April 2011 and plans for the city's development through 2030. The City completed a five-year review of the General Plan in November 2016 and there are currently no plans in place to update the plan. The General Plan states as a land use goal to "reinforce the City's compact urban form, establish urban growth limits, and manage where and how growth and conservation will occur."[12] The City's Plan includes a list of policies and programs to achieve this goal, including the following:

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[10] Butte County Association of Governments, December 2020, *6th Cycle Regional Housing Needs Plan*, page 12.

[11] City of Chico, 2011, *City of Chico General Plan*, pages 3-9.

[12] City of Chico, 2011, *City of Chico General Plan*, pages 3-38 to 3-29.

- Support coordinated land use planning for the Chico Planning Area.
  - Update the City's SOI as depicted in the General Plan Land Use Diagram.
  - Consult with Butte County and other entities, as appropriate, to facilitate a coordinated approach to land use planning within the Planning Area.
  - Consider agreements for critical planning topics and activities with Butte County and other agencies and special districts.
  - Fully implement an electronic permitting program for processing and record keeping of building, planning, and engineering projects.
- Maintain long-term boundaries between urban and agricultural uses in the west and between urban uses and the foothills in the east, and limit expansion north and south to produce a compact urban form.
  - Retain the Greenline.
  - Apply the City's Foothill Development Standards to projects in foothill areas.
- Maintain balanced growth by encouraging infill development where City services are in place and allowing expansion into Special Planning Areas.
  - When setting priorities for public infrastructure spending, give particular attention to improvements that will support development and redevelopment of the designated Opportunity Sites.
  - Require that applications for SOI updates and annexations are consistent with Local Agency Formation Commission requirements and include a conceptual plan for the affected territory, including pre-zoning and a plan for infrastructure financing and phasing.

3. City of Gridley

The City of Gridley is in the southwest corner of Butte County, approximately five miles south of the City of Biggs. Highway 99 runs in a north to south direction through the eastern portion of the city, and the Union Pacific Railroad extends through the center of the city. The City of Gridley was founded in 1905 as an agricultural service center built upon and surrounded by prime agricultural soils.

a. Population and Land Use Characteristics

Most of Gridley's working residents are employed in activities related to farming or in local retail and services. Some residents are farm workers who live in Gridley on a seasonal basis. A large percentage of the population is retired and not in the labor force. The 2020 population estimate for Gridley was 6,402;[13] it was 6,584 in 2010, 5,408 in 2000,[14] and 4,631 in 1990.[15]

According to BCAG post-Camp Fire projections, Gridley is anticipated to grow at about 1.6 percent annually from 2020 to 2045. Gridley's 6th Cycle 2022-2030 RHNA allocation is 344 housing units.[16]

Most of the future development in Gridley is expected to occur in the city's Planned Growth Area. This area could provide between 2,400 to 2,900 dwelling units as well as small-scale retail uses and office or other service uses.[17]

The city has a small commercial area that serves most daily needs of its residents, but most shopping for major items occurs in the other population centers (e.g., Chico or the Marysville-Yuba City area). Development in Gridley since the mid-1970s has been primarily single-family residential in character. Developments around the city's periphery have begun to depart from the traditional grid street system by incorporating curved street patterns and non-continuous streets. Some of the internal street patterns do not include adequate provisions for canal-crossings or other connections with the surrounding street systems.

b. General Plan

The City of Gridley adopted its current General Plan in 2009. The General Plan covers the planning period from 2009 to 2030. There are currently no plans to update the plan. The General Plan states as a land use goal to "achieve orderly, managed urban growth with a compact development pattern with high quality and

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[13] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark*.

[14] State of California, Department of Finance, November 2012, *E-8 Historical Population Estimates for Cities, Counties and the State, 2000-2010.*

[15] State of California, Department of Finance, August 2007, *E-8 Historical Population Estimates for Cities, Counties and the State, 1990-2000.*

[16] Butte County Association of Governments, December 2020, *6th Cycle Regional Housing Needs Plan*, page 12.

[17] City of Gridley, 2009, *City of Gridley General Plan*, page 10.

efficient public infrastructure and services."[18] The City's Plan includes a list of policies and programs to achieve this goal, including the following:

- The City will maintain a reasonable and logical expanded SOI that implements the General Plan.
- The City will consider Butte Local Agency Formation Commission policies and procedures in seeking a SOI that allows for building of complete neighborhoods and efficient infrastructure extension.
- The City will approve annexations only in areas adjacent to developed portions of the City with urban services and a General Plan land use designation.
- The City will give higher priority to development proposals within the City and existing SOI over development proposals outside the City's SOI.
- During this General Plan time horizon (through 2030), the City will focus new development in the existing City and Planned Growth Area, and away from Urban Reserve areas.
- The City will encourage infill development by analyzing infrastructure deficiencies, improving infrastructure in the existing City, creating fee programs that provide incentives for infill, and working with property owners to create equitable financing mechanism for infrastructure improvements in infill areas.
- The City will require projects proposed in the Industrial and Agricultural Industrial designations to provide an analysis of water, wastewater, drainage, and electricity demand. These developments may be conditioned to ensure the availability of existing and planned infrastructure capacity.
- The City will submit an application to Butte Local Agency Formation Commission to expand the SOI to implement the General Plan. The City will provide LAFCO with environmental and infrastructure analysis and documentation needed to expand Gridley's SOI to include the Planned Growth Area.
- The Planning Department will pre-zone land within the expanded SOI consistent with the General Plan prior to annexation.

[18] City of Gridley, 2009, *City of Gridley General Plan*, page 30.

- The City will work with property owners interested in infill development to identify infrastructure deficiencies and needs and to determine an equitable sharing of costs between the City and the property owner for infrastructure improvements.

An Area of Concern (AOC) was adopted by the Butte County LAFCO for the unincorporated area between the City of Biggs and the City of Gridley. This is a designated area where LAFCO is required to notify both the Cities of Biggs and Gridley of County development projects. This AOC is intended to help coordinate growth and facilitate communications concerning development proposals in the area.

4. City of Oroville

The City of Oroville is in southeastern Butte County along the Feather River, on the southwestern side of Lake Oroville. It is the seat of County government in Butte County. The city is bisected by Highway 70, which runs in a north-south direction, and by Highway 162 (Oro Dam Boulevard), which runs in an east-west direction. Highway 99 extends north-south 4 miles west of the city limits. Diverse economic activities have historically shaped the city and included gold mining, agriculture, railroads, lumber processing and dam construction and operation. The Oroville Dam, completed in 1968, is the centerpiece of the California State Water Project.

a. Population and Land Use Characteristics

Oroville grew rapidly during the Gold Rush, but lost population as mining activity declined. A second population boom coincided with construction of the Oroville Dam, which was completed in 1968. The city's population, which stood at 6,115 in 1960, had reached 7,536 by 1970. More recent growth in the area has been largely due to urban-to-rural migration, rather than major economic activity in the area. Oroville's population was 11,885 in 1990.[19] The City's population grew to 13,004 in 2000 and 15,546 in 2010.[20] As of January 1, 2020, the city's population was 19,440.[21]

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[19] State of California, Department of Finance, August 2007, *E-8 Historical Population Estimates for Cities, Counties and the State, 1990-2000.*

[20] State of California, Department of Finance, November 2012, *E-8 Historical Population Estimates for Cities, Counties and the State, 2000-2010.*

[21] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark.*

Oroville is projected to grow 0.59 percent annually between the years 2020 to 2045 according to BCAG projections. The 6th Cycle 2022-2030 RHNA allocation for Oroville is 625 housing units.[22]

The Oroville area is characterized by low-density residential land. The highest density residential development in Oroville consists primarily of single-family homes, with a lesser number of apartments, mobile homes, and mobile home parks. The area did not grow from a single core; rather, it became urbanized by the merging of fairly distinct and separate communities, including the original areas of downtown Oroville, Thermalito, and South Oroville. There is a significant amount of vacant and underutilized residential and commercial land in Oroville.[23]

Major sources of economic growth and employment in the Oroville area are wood products and agriculture. The seasonal nature of employment in these industries has contributed to cyclical variations in the community's economy. The tourist-related economy, also seasonal, has contributed to this problem, although the establishment of two Native American gaming casinos has somewhat stabilized the seasonal nature of the tourism sector. Other local industries, such as banking and services, have lent some stability to the city's business climate. Residents of the area generally also work and shop in Oroville, except when making major purchases.

b. General Plan

- ♦ The City of Oroville 2030 General Plan was adopted in March 2015. The General Plan shows land use designations for an area extending beyond the city limits and SOI, with designations outside the SOI primarily for Agriculture, Rural Residential, and Resource Management uses. To address growth management, the General Plan includes a land use goal to "provide for orderly, well-planned, and balanced growth consistent with the limits imposed by infrastructure and the City's ability to assimilate new growth."[24] The General Plan includes a list of policies and actions to achieve this goal, including the following: Establish a logical methodology for annexation of land into the City that will reduce "island effects" and provide a more coherent city limit boundary. Annexations shall be coordinated with the appropriate

[22] Butte County Association of Governments, December 2020, *6th Cycle Regional Housing Needs Plan*, page 12.

[23] City of Oroville, 2015, *City of Oroville General Plan*, pages 3-8.

[24] City of Oroville, 2015, *City of Oroville General Plan*, pages 3-37 to 3-38.

property owners and service providers and in substantial conformance with Butte LAFCO Guidelines.

- Establish logical jurisdictional boundaries for the City. Work with service districts to provide services to facilitate property owner requests for annexation of properties within the City's SOI.

- Ensure that all new development pays its fair share in financing of public facilities and services.

- Link the rate of growth in Oroville to the provision of adequate services and infrastructure, including schools, roadways, police, fire and medical services, and water supply and wastewater treatment infrastructure to ensure that new development will not negatively impact existing infrastructure and level of services.

- Encourage non-conforming land uses to relocate or redevelop in accordance with current land use and zoning designations.

- Ensure all new development conforms to current land use and zoning designations. Require preparation and approval of Specific Plans for large newly developing areas on the periphery of the City prior to annexation and development of these areas. At a minimum, Specific Plans shall be prepared for the Rio d'Oro, Oro Bay, and South Ophir Road Specific Plan Areas, as mapped in Figure LU-6. Specific Plans shall comply with the requirements of this Land Use Element.

- Require new specific plans to provide sufficient employment generating land uses to achieve a jobs-to-housing balance equal to the level provided in the incorporated communities of Butte County.

- Support infill development by encouraging eligible infill projects to use the streamlined CEQA review provisions allowed by Senate Bill 226. Eligible infill projects are described in Appendix M of the CEQA Guidelines. Eligibility is based on performance standards such as on-site renewable power generation and proximity to transit.

- Review Butte County General Plan Updates, General Plan Amendments, and major development project proposals within the SOI, and inform County staff of project/plan consistency with this General Plan and City regulations.

- ♦ As required by law, update the Citywide Municipal Services Review as the City's population and employment base grows to identify what new or expanded public facilities and services are needed to adequately meet the needs of both existing and projected new development.
- ♦ Review and revise, as necessary, the Development Code to ensure its consistency with this General Plan.

5. Town of Paradise

The Town of Paradise is at the juncture of the western slopes of the Cascade and Sierra Nevada mountain systems in eastern Butte County. Topography and drainage patterns have significantly influenced development patterns in the area and steep canyons define the region, including the West Branch of the Feather River to the east and Butte Creek-Little Butte Creek to the northwest. The Town of Paradise occupies an area identified as the Lower Ridge, which ranges from a 2,200-foot elevation in the north to a 1,500-foot elevation at the Town's southern boundary.

a. Population and Land Use Characteristics

Originally settled during the Gold Rush era, the community of Paradise and its surrounding area grew very slowly during the first half of the 20th century. In 1970, the Paradise area population stood at 14,539. Paradise was incorporated in 1979; the population of the area that was incorporated increased by approximately 50 percent between 1970 and 1980, from 14,539 to 22,571. Paradise's population was 25,401 in 1990.[25] The population grew to 26,408 in 2000 and 26,218 in 2010.[26] The 2018 population was estimated to be 26,256 prior to the devastating November 2018 Camp Fire, which destroyed nearly 14,000 housing units total, including more than 11,000 in the Town of Paradise, which led to a significant population decline in the town.[27] As of January 1, 2020, the population was estimated as 4,631.[28]

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[25] State of California, Department of Finance, August 2007, *E-8 Historical Population Estimates for Cities, Counties and the State, 1990-2000.*

[26] State of California, Department of Finance, November 2012, *E-8 Historical Population Estimates for Cities, Counties and the State, 2000-2010.*

[27] Butte County District Attorney, *The Camp Fire Public Report: A Summary of the Camp Fire Investigation*, June 2020; California Department of Housing and Community Development, *Butte County Regional Housing Needs Determination*, June 2020.

[28] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark.*

According to BCAG post-Camp Fire projections, Paradise is anticipated to grow at about 6.7 percent annually between the years 2020 to 2045. Paradise's 6th Cycle 2022-2030 RHNA allocation is 7,179 housing units, which includes 6,837 units designated as fire rebuild units.[29]

Paradise is predominately residential in character, and most of its dwelling units are single-family. The Town's central business district consists of a narrow band of commercial uses along both sides of the Skyway, generally between Black Olive Drive and Maxwell Drive. Shopping areas in Chico are 20 minutes away by car. The Town contains relatively little industrial development. Agricultural uses, including vineyards, orchards and grazing land, are located primarily in the southern third of the Town. Many of these land uses were burned during the Camp Fire.

b. General Plan

The most recent General Plan for the Town of Paradise was adopted in 1994, with a planning horizon that extends to 2008. The Town is anticipated to update its General Plan in the next few years.

Key Land Use policies of the existing General Plan state the following:

- ♦ The limitations imposed on the Paradise area by topography, soils and other physical features shall be recognized in site-specific development design as well as when establishing long-term growth objectives.
- ♦ The environmental and infrastructure constraints analysis system should be used to determine future zoning classifications, densities, and intensities of land use and to evaluate future development projects.
- ♦ In conjunction with input solicited from Butte County, as soon as feasible the Town shall prepare a specific plan for an orderly and balanced development of the secondary planning area south of the Town limits which will more precisely determine residential densities, roads, drainage, utilities, and sewage disposal.

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[29] Butte County Association of Governments, December 2020, *6th Cycle Regional Housing Needs Plan*, page 12.

- ♦ The "Open Space/Agriculture" land use designation shall be applied to most lands within the Butte County urban reserve area in the southerly secondary planning area as a holding designation to prevent premature conversion to urban uses until such time as a specific plan is adopted and public facilities and services are available.
- ♦ The Town should consider annexation of the substantially undeveloped area between Neal Road and the Feather River, including portions of the Lime Saddle Community Services District.

There is no municipal wastewater system currently serving the Town of Paradise, with all properties making use of on-site septic systems. Prior to the Camp Fire, the Town was considered one of the nation's largest urban areas that uses septic systems instead of a municipal sewer system. Since the mid-1980s, requirements for siting of on-site sewage disposal systems been adopted that have significantly constrained new development. Typically, the minimum parcel size for newly created residential parcels is one-half acre, which would accommodate a single-family residence and the required septic system and septic system repair area. Commercial parcels must use a special design system with a maximum treated effluent discharge of 2,000 gallons per acre per day.

The Town of Paradise is in the process of designing a sewer collection system that would serve a large portion of the downtown area, decreasing the reliance on individual systems in that area. The project would serve 1,469 of the 11,000 parcels in the Town through sewer collection systems that would convey the wastewater west to connect to the City of Chico's wastewater collection system. The proposed project is intended to encourage the opening of new businesses and stop degradation of the local groundwater supply. A technical memorandum from November 2020 shows that the Town hopes to have the entire project finished by the year 2056.[30]

D. Butte County LAFCO

The Butte County Local Agency Formation Commission (LAFCO) is governed by the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000. This act superseded the Cortese-Knox Act of 1985, which in turn superseded the 1963 Knox-Nisbet Act. The Cortese-Knox-Hertzberg Act declares that "among the

[30] Town of Paradise - Paradise Sewer Project Phase 1 Report. Accessed January 2021.

purposes of a commission are discouraging urban sprawl, preserving open-space and prime agricultural lands, efficiently providing government services, and encouraging the orderly formation and development of local agencies based upon local conditions and circumstances. One of the objectives of the commission is to make studies and to obtain and furnish information which will contribute to the logical and reasonable development of local agencies in each county and to shape the development of local agencies so as to advantageously provide for the present and future needs of each county and its communities."[31] In meeting these responsibilities, each LAFCO is required "to review and approve or disapprove, with or without amendments, wholly, partially, or conditionally, proposals for changes of organization or reorganization, consistent with written policies, procedures, and guidelines adopted by the commission."[32]

According to Government Code Section 56021, "change of organization" means any of the following:

- A city incorporation.
- A district formation.
- An annexation to, or detachment from, a city or district.
- A dis-incorporation of a city.
- A district dissolution.
- A consolidation of cities or special districts.
- A merger of a city and district or establishment of a subsidiary district.

Government Code Section 56036(a) and (b) define the special districts that fall under LAFCO jurisdiction. School districts and redevelopment agencies, among others, are not included within this definition and are therefore not subject to LAFCO review.

In addition to its regulatory responsibilities, LAFCO is empowered to initiate and to make studies of existing governmental agencies. These studies include, but are not limited to, inventories of local agencies and determination of their maximum service area and service capabilities.

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[31] Government Code Section 56301.
[32] Government Code Section 56375(a)(1).

1. Municipal Service Review

The requirement for LAFCOs to conduct reviews of local municipal services was established by the Cortese-Knox-Hertzberg Act of 2000. These Municipal Service Reviews (MSRs) are conducted by LAFCOs utilizing specific guidelines developed by the Office of Planning and Research. It is the statutory responsibility of LAFCOs to prepare a review of each municipal service in order that this information can be used to inform planning decisions that promote orderly growth and development, preserve the state's finite open space and agricultural land resources, and ensure that high quality public services are provided to all California residents in the most cost effective and efficient manner.

2. Spheres of Influence

As the basis in part for making decisions about organizational changes and annexations, LAFCO must adopt a SOI for each local agency subject to LAFCO regulation. The Cortese-Knox-Hertzberg Act defines a SOI as "a plan for the probable ultimate physical boundaries and service area of a local agency, as determined by the commission."[33] In practice, "ultimate" is typically defined as a 20-year planning horizon. The SOI plan must be developed using the information generated within the MSR.

LAFCO Policy 4.1.11 (Action Options) states:

> "LAFCO shall take one of the following four actions on an application for annexation or detachment:
>
> - Approve the application if the territory proposed for annexation is contiguous to an existing city boundary and within that city's adopted Urban Service Area.
> - Approve the application proposal if it has found the change to result in the most efficient delivery of services for the affected population and to comply with other applicable standards.
> - Modify or conditionally approve the proposal to ensure efficient service delivery and meet other policy objectives. These may include, but are not limited to: waiver of detachment from an existing service provider, or, in the alternative, appropriate detachment fees; entering into a Joint Powers Agreement with another service provider; and, requiring the inclusion of additional territory or exclusion of territory in order to achieve more logical

[33] California Government Code Section 56076.

boundaries, subject to a protest hearing if required; such other conditions as authorized by Section 56886 of Cortese-Knox-Hertzberg.

- Disapprove the annexation. In the event of such a disapproval, LAFCO may, where appropriate, provide direction as to changes in the proposal that could cause the Commission to consider approving a revised application."

In determining the SOI of each local agency, LAFCO must consider and prepare a written statement of its determinations with respect to each of the following:

- The present and planned land uses in the area, including agricultural and open space lands.
- The present and probable need for public facilities and services in the area.
- The present capacity of public facilities and the adequacy of services, which the agency provides or is authorized to provide.
- The existence of any social or economic communities of interest in the area if the commission determines that they are relevant to the agency.[34]

Once these spheres are adopted, LAFCO decisions must be consistent with applicable spheres.[35] This means that LAFCO may not approve city annexations outside the adopted SOI for the city.

3. Spheres of Influence in Butte County

The Butte County LAFCO is required to conduct reviews of local municipal services per the Cortese-Knox-Hertzberg Act of 2000. The MSRs aim to promote orderly growth and development by providing a comprehensive review of municipal service capabilities for parcels located within a jurisdiction and their SOI.

LAFCO conducted a comprehensive review of city and district SOIs in 1985. In the past two decades, LAFCO has adopted new SOI boundaries for all five municipalities in the County. The following discussion briefly summarizes municipality and district service areas for the five municipalities: Biggs, Chico, Gridley, Oroville, and Paradise.

[34] Government Code Section 56425(e).
[35] Government Code Section 56377.

a. City of Biggs SOI

In the Biggs area, LAFCO regulates the SOI boundaries of the City of Biggs, as well as the boundaries of the Biggs-West Gridley Water District, Butte Water District, Reclamation District No. 833, and Butte Resource Conservation District. There are two County Service Areas (CSAs) in the Biggs area. One CSA provides maintenance for the Schor swimming pool and the other provides financing for emergency services.

In December 2015, LAFCO adopted the Final Municipal Service Review Update and Sphere of Influence Plan for the City of Biggs, which amended the City's SOI. The SOI was expanded from approximately 540 acres to 2,197 acres to include the land use designations set forth in Biggs' 2014 General Plan.[36] The new boundary includes approximately 746 acres of vacant land for agricultural uses, 662 acres for residential development, and 55 acres of vacant land for industrial uses.[37] The City of Biggs' SOI is mapped in Figure 1-2.

b. Chico Area SOI

In the Chico area, LAFCO regulates the SOI boundaries of the City of Chico, as well as the boundaries of the Chico Area Recreation District, the Butte County Mosquito Abatement District, and the Pine Creek Cemetery District. In the Chico area, there are approximately 47 CSAs. Of these CSAs, 12 provide lighting services, five provide storm drainage service, and one provides sewer service. The remaining CSAs provide a combination of services, such as lighting, draining, and fire.

In October 2018, LAFCO amended the SOI boundary for the City of Chico. The previous SOI boundary was approximately 39.5 square miles in size. Chico's General Plan describes a need for a larger SOI to meet future housing and job needs. The adopted SOI for the City of Chico is approximately 43.9 square miles in size, which is an 11-percent increase compared to the previous SOI and adds six areas to the city's SOI.[38] The City of Chico's existing SOI is illustrated in Figure 1-3.

[36] Butte LAFCO, December 2015, *Final Sphere of Influence Plan City of Biggs*, page 16.
[37] Butte LAFCO, December 2015, *Final Sphere of Influence Plan City of Biggs*, page 16.
[38] Butte LAFCO, October 2018, *City of Chico Sphere of Influence Plan*, page 8

The amended SOI includes three special planning areas: North Chico, Bell/Muir, and Doe Mill/Honey Run. The North Chico special planning area is in the northern portion of the city, near the Chico Municipal Airport. The special planning area is approximately 484 acres in size and could support a combination of residential, commercial, industrial, and open space uses. The Bell/Muir special planning area is in the northwestern portion of the city and is approximately 398 acres in size. Some areas in the Bell/Muir special planning area have already been developed; future development in that planning area would consist of rural residential and agricultural uses. The third special planning area, Doe Mill/Honey Run, is approximately 1,441 acres in size and is in the southeastern area of the city, in the foothills. Development in the Doe Mill/Honey Run planning area would generally consist of recreation open space uses and residential uses.

c. Gridley Area SOI

In the Gridley area, LAFCO regulates the SOI boundaries of the City of Gridley, as well as the Butte and Biggs-West Gridley Water Districts, the Gridley-Biggs Cemetery District, and three CSAs. Of the three CSAs, two provide swimming pools and one provides ambulance service. These service districts are further discussed in other chapters of this Setting and Trends Report.

The SOI for the City of Gridley was last amended in December 2010 by LAFCO. Gridley's SOI was expanded to accommodate approximately 2,114 new dwelling units. The amended SOI is located north of Gridley and would allow development in Gridley's planned growth area as outlined by the General Plan. The SOI planned growth area includes residential, open space, neighborhood center mixed-use, agricultural, industrial, and public land use designations.[39]

d. Oroville Area SOI

In the Oroville area, LAFCO regulates the SOI boundaries of the City of Oroville, as well as the Thermalito Irrigation District; the South Feather Water and Power Agency (formerly the Oroville-Wyandotte Irrigation District); the Lake Oroville area (for sewage collection, treatment and disposal); the Feather River Recreation and Park District; the Oroville, Bangor and Thompson Flat Cemetery Districts; the Oroville and Butte County Mosquito Abatement Districts; and 10 CSAs. Of these CSAs, five provide lighting and one provides drainage services. The remaining CSAs provide a combination of services such as fire, drainage, and sewer. The

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[39] Butte LAFCO, December 2010, *Final Sphere of Influence Plan for the City of Gridley*, page 20.

major school, utilities, fire, and parks and recreation districts in the Oroville area are further discussed in other chapters of this Setting and Trends Report.

The SOI for the City of Oroville was last amended in December 2014 by LAFCO. The previous SOI was approximately 26,343 acres in size and the expanded SOI adds 9,904 acres to the city at the northern and southern boundaries of the city. The southern SOI expansion area includes the Rio d' Oro Specific Plan Area and the unincorporated community of Palermo.[40] The northern SOI expansion area consists of 68 parcels and includes the State-owned Thermalito Forebay and Thermalito Diversion Pool.[41]

e. Paradise Area SOI

In the Paradise area, LAFCO regulates the SOI boundaries of the Town of Paradise as well as the Paradise Irrigation District, the Paradise Recreation and Park District, the Paradise and Kimshew Cemetery Districts, and CSA No. 4, which provides storm drainage service in the Upper Eden Ridge area. The utilities and parks and recreation districts are further discussed in other chapters of this Setting and Trends Report.

In 1985, LAFCO adopted a 20-year SOI for Paradise, which was intended to deal with long-term growth. Since then, the SOI has gone through several annexation adjustments and amendments; however, no comprehensive update has been completed since 1985. On June 7, 2007, LAFCO approved an annexation that added 8.13 acres of land area along the northwest boundary of the Town. In 2000, the SOI for Paradise was approximately 17,502 acres in size and the SOI now encompasses approximately 29,211 acres. In August 2007, LAFCO completed a municipal service review to analyze service capabilities in the town. The Paradise SOI is mapped on Figure 1-5.

The three major service concerns within in the Paradise SOI are drainage, sewage disposal, and vehicular access, particularly in the event of an emergency. The Town of Paradise levies varying development fees to maintain its gravity flow drainage system. The Town does not provide a municipal sewer system, and development is constrained by a restrictive sewer disposal ordinance. Adopted in 1983 and updated with revisions in 2000, the ordinance sets forth standards for septic system installation and maintenance, and, depending on soil characteristics,

[40] Butte LAFCO, December 2014, *City of Oroville Sphere of Influence Plan,* page 18.

[41] Butte LAFCO, December 2014, *City of Oroville Sphere of Influence Plan,* pages 18 and 28.

requires additional land area for leach fields in new developments throughout the Town. As noted previously in Section I.C.5, the Town is pursuing a sewer collection system to serve a portion of the Town.

Fire safety issues are a significant concern due to limited road access to and through the area, which proved to have fatal consequences in the 2018 Camp Fire, discussed in more detail in the Safety and Hazards chapter. The Skyway, the major county arterial that serves Paradise and the Magalia area, has a limited capacity that restricts evacuation and access by emergency vehicles. The Upper Ridge communities are especially vulnerable to wildfires because they are isolated on top of a relatively narrow, wooded ridgeline. The existing two-lane roadway across the Magalia Reservoir dam also creates a potential bottleneck for evacuation during catastrophic events. As the region rebuilds from both the Camp Fire and 2020 North Complex Fire, ingress and egress will be primary considerations.

In addition to the problems created by emergency access and congestion during an evacuation, an earthquake is capable of causing the main earthen Magalia Reservoir dam to subside, which would result in partial or total loss of the roadway. On December 15, 1998, the County Board of Supervisors acted on the recommendations of the July 1996 Skyway Improvement Program Feasibility Study by directing the Department of Public Works to proceed with a project study of possible design alternatives to widen the Skyway from two to four lanes from Pentz Road to South Park Drive. The Board of Supervisors adopted an Environmental Impact Report for this project in 2005. In 2009, BCAG worked with the Town of Paradise to prepare the Skyway Corridor Transportation Study to inform the Skyway project, and the final report was accepted by the Paradise Town Council in February 2009.

Following the 2017 Oroville Dam spillway incident in which significant spillway damage prompted the mass evacuation of 188,000 residents, local dams faced increased scrutiny and the Magalia Reservoir Dam was downgraded to "poor" condition.[42] According to the Paradise Irrigation District (PID), which is responsible for the Magalia Dam, PID has been awarded Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program funding through the California Governor's Office of Emergency Services (Cal OES) to address concerns over reliability and seismic stability of Magalia Dam. In December 2020,

[42] Bizjak, T. and Kasler, D. 2019, June 26. Fire-ravaged Paradise water agency faces state ultimatum: Fix your cracked dam spillway. Sacramento Bee, https://www.sacbee.com/news/politics-government/capitol-alert/article231933143.html

PID issued a request for proposals (RFP) for the planning phase of work. Following the preparation of the Magalia Dam Engineering Study, a subsequent RFP will be issued to perform the work.

E. Other County and Regional Plans and Policies

A variety of other County and regional plans and policies influence land use in Butte County, which are summarized in this section.

1. Butte County Association of Government Plans

BCAG is a regional council of governments created in 1969 by an agreement among Butte County and the municipalities of Biggs, Chico, Gridley, Oroville, and Paradise. Its governing board is composed of members of city councils and the Butte County Board of Supervisors. BCAG has five major areas of authority and responsibility:

- As a Regional Transportation Agency, to administer the requirements of the federal and State Clean Air Acts.
- To develop a Countywide Nonattainment Plan to satisfy all requirements of the federal and State Clear Air Acts.
- To develop a Regional Housing Allocation Plan.
- To review the transportation plans and programs of member agencies and endorse them based upon their satisfaction of regional need and their consistency with adopted regional plans and policies.
- To serve as an area-wide clearinghouse for projects proposed for federal funding assistance.

In 2020, BCAG updated their *Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS), which has a planning horizon extending to 2040. This document outlines the state of transportation topics such as aviation, goods movement, highways, mass transit, non-motorized transportation, and transportation systems management. It also addresses transportation concerns that have emerged in the region as a result of rapid growth, a deteriorating rural roadway system, and slow development of new transportation facilities. The RTP/SCS develops implementation strategies for achieving planning goals and identifies financial constraints in solving transportation needs. As the County's SCS, the plan also promotes more sustainable land use patterns, such as increased mixed-use development and other development in areas that are served with infrastructure, increased residential and commercial density in areas near transit, and housing that serves the local workforce to improve the jobs/housing balance.

BCAG's primary funding for major infrastructure improvement is the State Transportation Improvement Program (STIP). At the local level, funding to widen State Route 70 to provide a continuous four-lane highway to Chico is Butte County's top priority. While the corridor is funded and programmed, the downturn of the economy as a result of COVID-19 and decreased gas tax revenues associated with public health recommendations of shelter-in-place has led to BCAG reserving future STIP programming capacity of the RTP/SCS should revenues in the STIP not materialize. A backlog of local roadway rehabilitation improvements is also a major concern in Butte County. The cities and County will continue to be required to make the most of other resources available, such as the Regional Surface Transportation Program, the Transportation Enhancement Activity Program, Congestion Mitigation and Air Quality Program, gas tax revenues, as well as other funds, in order to address the rehabilitation needs of the county for operations and maintenance. More information on the RTP/SCS is provided in Chapter 5, Transportation and Circulation, of this Setting and Trends Report.

2. Air Quality Plans

The Butte County Air Quality Management District (BCAQMD) governs air quality controls and standards at the local level through the administration of a set of rules and regulations that establishes permit requirements and procedures for activities involving air emissions. See Chapter 15, Air Quality, for information about plans administered by the BCAQMD and other agencies related to air quality.

3. Airport Master Plans

Airport master plans are used to assess the demand for an individual airport's facilities and guide the development necessary to meet those demands. Two of the airports in Butte County – Chico Municipal Airport and Oroville Municipal Airport – have prepared Airport Master Plans.

The City of Chico adopted the Chico Municipal Airport Master Plan in 2003. The plan is a comprehensive review of existing and projected facilities and infrastructure on the airport properties as well as future traffic demands and use patterns for the airport extending into the future. In 2014, commercial service was discontinued at Chico Municipal Airport, but in 2020 the City of Chico was awarded a Federal Aviation Administration (FAA) grant to assist with restarting commercial service. This was made possible by a 2018 amendment to the FAA reauthorization that removed a rule that kept the airport from getting commercial air grants.

The Oroville Municipal Airport Master Plan was adopted in 1990 and has no plans to update it because much of the information in the plan is still applicable. The airport is in the beginning stages of updating its Airport Layout Plan to accommodate possible new uses at the airport.[43]

4. Airport Land Use Plans

On November 15, 2017, Butte County's Airport Land Use Commission (ALUC) adopted the current *Butte County Airport Land Use Compatibility Plan* (ALUCP). It establishes procedures and criteria for the ALUC to review proposed land use development and affected cities within the county for compatibility with airport activity. State law requires public access airports to develop comprehensive land use plans, designating airport vicinity land use and clear zones. Such plans are to be adopted by the County's ALUC, which comprises two members appointed by the municipalities, two members appointed by the airport managers, two members appointed by the County Board of Supervisors, and one member from the public-at-large appointed by the ALUC.

The Butte County ALUCP is distinct from airport master plans, which address planning issues within a specific airport. The purpose of a compatibility plan is to ensure that incompatible development does not occur on lands surrounding the airport. The 2017 ALUCP encompasses the four principal airports in the county: Chico Municipal Airport, Oroville Municipal Airport, Paradise Skypark Airport, and the Ranchaero Airport.

5. Integrated Waste Management Plan

The *Butte County Solid Waste Management Plan* was originally adopted in December 1975, and a revised draft was prepared in 1985 with the intention of completing the plan in 1988, as required by State law. Upon passage of the California Solid Waste Management Act of 1989 (AB 939), which substantially changed requirements for waste management planning, the County opted to prepare the newly required components in conjunction with four of the county's five municipalities; Gridley did not participate. This cooperative effort resulted in development of a Waste

[43] Butte County Association of Governments, 2020, Regional Transportation Plan/Sustainable Communities Strategy 2020-2024, Page 156.

Generation Study, a Source Reduction and Recycling Element and a Household Hazardous Waste Element. These contributed to the *Integrated Waste Management Plan*, which was completed in the early 1990s and updated in October of 2005. More information on the Integrated Waste Management Plan is provided in Chapter 6 of this Setting and Trends Report.

6. Hazardous Waste Programs

Senate Bill 1082, passed in 1993, requires a Certified Unified Program Agency in every county to provide regulatory oversight for hazardous materials and hazardous waste management programs. On February 1, 2005, the Butte County Public Health Department (BCPHD) was certified in that role. BCPHD manages several hazardous waste programs, including the Hazardous Waste Generator Program, which aims to protect the public and environment from exposure to hazardous waste by regulating the businesses in the county that generate hazardous waste. The program includes inspections, enforcement, public education, and technical assistance for businesses. More information on hazardous waste programs in the county are provided in Chapter 6 of this Setting and Trends Report.

7. Butte County Storm Water Management Program

In March 2003, the Butte County Department of Public Works submitted a *Storm Water Management Program* (SWMP) to the California Regional Water Quality Board. This Program was developed as a requirement of Phase II of the National Pollutant Discharge Elimination System Program (NPDES), as ordered by the United States Environmental Protection Agency. The program is required to be fully implemented by July 1, 2008, and the Water Quality Order No. 2013-001-CWQ required full compliance by 2018. It is a comprehensive program comprised of various activities designed to reduce storm water pollution to the maximum extent practicable and eliminate prohibited non-storm water discharges in accordance with federal and State laws and regulations. The core elements of the SWMP include:

- Public education and outreach.
- Public participation/involvement.
- Illicit discharge detection and elimination.
- Construction site stormwater runoff control/new development.
- Post construction storm water management.
- Pollution prevention/good housekeeping for County operations and facilities.

The Program also includes descriptions of:

- ♦ Best management practices to address specific activities identified in the regulations, such as illicit discharges.
- ♦ A process for prioritizing Program activity implementation.
- ♦ Staff and equipment available and required to implement a Program activity.

More information on these programs is provided in Chapter 6 of this Setting and Trends Report.

F. State and Federal Agencies

A number of State and federal agencies exercise some level of regulatory control over land use decisions in Butte County, some through permitting or review authority and others through management of public lands.

1. Agencies with Permitting Authority

The following State and federal agencies hold permitting authority over some land use decisions in Butte County.

a. State Lands Commission

The State Lands Commission has exclusive jurisdiction over all submerged lands owned by the State as well as the beds of navigable rivers, sloughs, and lakes. The Commission has the authority to grant three kinds of permits: mineral extraction leases, dredging permits, and land use leases. Dredging permits are required for any dredging of navigable waterways for the improvement of navigation, reclamation, and flood control. Land use leases are required for any proposal to utilize navigable waterways for any purpose other than dredging (e.g., piers, floats, and docks).

b. Central Valley Flood Protection Board

The Central Valley Flood Protection Board (formerly the State Reclamation Board) is responsible for ensuring approximately 1,600 miles of State and federal levees and the facilities of the adopted State Plan of Flood Control are maintained to prevent flooding. The Central Valley Flood Protection Board is authorized to grant Encroachment Permits for any activity proposed along or near a regulated stream, designated floodway, or any flood system located within the State Plan of Flood Control.

c. California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) has jurisdiction on the "conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations."[44] The CDFW has authority over various environmental permits, including the California Endangered Species Act Permits, Lake and Streambed Alterations Agreements, Suction Dredge Permits, Habitat Restoration and Enhancement Act Approvals, and the Timberland Conservation Program. The CDFW can act as a trustee or responsible agency for the California Environmental Quality Act (CEQA) when a project affects fish, wildlife, or their habitat. The CDFW also operates the Feather River Fish Hatchery, manages the Oroville Wildlife Area, and works with agencies and organizations to protect threatened and endangered species.

d. State Regional Water Quality Control Board

The State Regional Water Quality Control Board (RWQCB) sets water quality standards and issues permits or orders for cleaning up a contaminated site. Any project that will discharge waste into "waters of the United States" must conform to waste discharge requirements established by the RWQCB. These requirements serve as the federal National Pollutant Discharge Elimination System (NPDES) permit. The RWQCB also works to obtain coordinated action in water quality control, including prevention and abatement of water pollution and nuisances.

e. California Department of Transportation

The California Department of Transportation (Caltrans) has authority over all State highway and freeway rights-of-way, including easements, and undeveloped rights-of-way that have been acquired in anticipation of future construction. Any project that proposes to construct a road connection or perform earthwork within a State highway or freeway must obtain an encroachment permit from Caltrans.

Caltrans is a major actor in highway facilities planning in Butte County. The top priority planned and proposed projects include:

- State Route 70 Corridor Improvement Project, which will improve safety by providing continuous passing opportunities from Palermo Road to north of Cox Lane and East Gridley Road to the Butte-Yuba County line. The project includes widening State Route 70 from two lanes to five lanes.

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[44] California Department of Fish and Wildlife, *CDFW Role in CEQA*. https://wildlife.ca.gov/Conservation/CEQA/Role, accessed February 9, 2021.

- ♦ State Route 70 Continuous Passing Lanes Project will achieve a four-lane facility near Marysville between Laurellen Road and the South Honcut Creek Bridge.

f. United States Army Corps of Engineers

The United States Army Corps of Engineers (USACOE), pursuant to the Rivers and Harbors Act, maintains jurisdiction over all navigable waterways (including non-navigable streams, creeks, marshes, and diked lands) and requires a permit for any work within these waterways. The USACOE provides official oversight for wetland delineations and mapping.

2. Agencies with Review Authority

The following agencies, while they do not issue permits, maintain review authority and may comment on aspects of a development proposal that are related to their particular areas of expertise.

a. State Department of Boating and Waterways

The State Department of Boating and Waterways comments on river-oriented features of a riverfront project, such as potential for navigation hazards, relation to existing or planned boating facilities, and the public trust doctrine. This Department also administers grants and loans for marina development and boat ramps and reviews federal and local ordinances regulating boating activities.

b. California Department of Water Resources

The California Department of Water Resources (DWR) built and now operates the State Water Project, which supplies half of the water delivered in California as far south as Riverside County. Part of this statewide project includes the water provided by the Oroville Dam via the Feather River. The Oroville-Thermalito Complex is a State Water Project facility that includes three power plants, Lake Oroville, Thermalito Forebay and Afterbay, and the Feather River Fish Hatchery. The DWR also coordinates CEQA and National Environmental Policy Act (NEPA) comments for many departments within the State Resources Agency. Some of the DWR's original duties have been turned over to the CDFW and the State Department of Parks and Recreation. These agencies cooperate with DWR as subcontractors for specialized services in the provision of fish, wildlife and habitat management, and recreational operations and enhancement.

c. State Department of Parks and Recreation

The State Department of Parks and Recreation reviews development projects in relation to State recreation facilities, including Lake Oroville, the Thermalito Forebays (North and South), and Bidwell Canyon. Within the Department of Parks and Recreation, the State Office of Historic Preservation is the designated State Historic Preservation Office (SHPO), charged with monitoring State- and federally registered historic resources and carrying out other statutory responsibilities.

d. State of California Native American Heritage Commission

The State of California Native American Heritage Commission reviews projects and comments on potential impacts to Native American archaeological resources. The Commission is directly involved if Native American artifacts or remains are discovered during development activities.

e. California State Clearinghouse

The California State Clearinghouse, within the Governor's Office of Planning and Research, is the point of contact for review of environmental documents where one or more State agencies will be a responsible or trustee agency. The Clearinghouse circulates environmental documents among State agencies, coordinates review, and forwards comments to the lead agency.

f. State Mining and Geology Board

The State Mining and Geology Board reviews petitions (by an individual or organization) to classify specific lands that contain significant mineral deposits and that are threatened by land use incompatibilities. Mineral lands classified as having regional or statewide significance, in accordance with California's Surface Mining and Reclamation Act, must be recognized in the County General Plan through adoption of appropriate and compatible land use designations and through establishment of policies and implementation programs for conservation and development of these resources.

g. United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) has review authority over environmental documents that are prepared and circulated pursuant to the National Environmental Policy Act (NEPA). The EPA can comment on draft environmental impact statements (EISs), and NEPA procedures require filing of final EISs with the EPA. The EPA also has authority over development projects pursuant to Section 404 of the Clean Water Act, an authority that overlaps with that of the USACOE. Generally, the EPA reviews Department of Army permits for compliance with guidelines for implementing Section 404 requirements. The EPA can, in rare cases, override an USACOE decision on a Department of Army permit in order to prohibit discharges into waterways.

h. United States Fish and Wildlife Service

The United States Fish and Wildlife Service (USFWS) must be consulted on all federal projects, such as the USACOE/Department of Army permits, pursuant to the Fish and Wildlife Coordination Act. The USFWS comments on potential project effects on "endangered or threatened" plant and animal species under the federal Endangered Species Act. In reviewing a project, the USFWS could issue a "jeopardy" determination and would propose reasonable alternatives to the permitting agency, in a manner similar to the CDFW process. The USFWS also comments generally on potential effects on fish and wildlife resources.

i. National Marine Fisheries Service

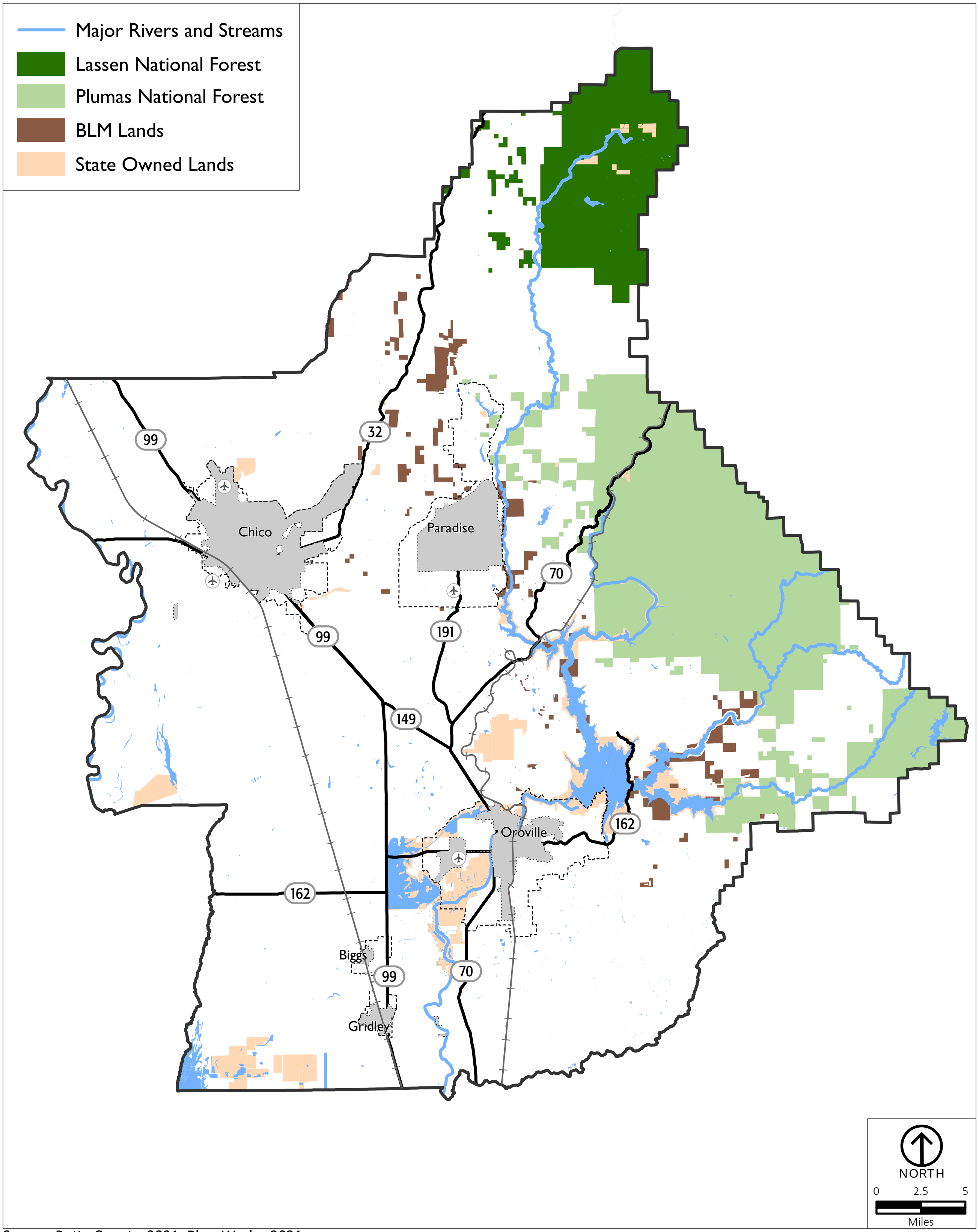
The National Marine Fisheries Service is also consulted on all Department of Army Permits as part of the Fish and Wildlife Coordination Act. The National Marine Fisheries Service reviews development projects in relation to overall effects on anadromous fish, such as salmon, striped bass, and steelhead. The National Marine Fisheries Service is also consulted by federal agencies before taking any action that could affect endangered or threatened species per the Endangered Species Act.

3. Federal and State Lands

Several federal and State agencies manage land in Butte County, affecting land use decisions in those areas.

a. United States Forest Service

The United States Forest Service is a major landowner in Butte County. Its holdings total 134,840 acres of federally owned National Forest Land, including portions of Plumas National Forest and Lassen National Forest, which are displayed in Figure 1-12. The Forest Service's *Land and Resource Management Plans* for Plumas National Forest (1988) and for Lassen National Forest (1993, as amended) guide all Forest Service activities on these lands.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE 1-10

FEDERAL AND STATE LAND OWNERSHIP

b. United States Bureau of Land Management

The United States Bureau of Land Management (BLM) owns 15,590 acres in Butte County, consisting of scattered foothill lands, displayed in Figure 1-12. BLM completed the *Resource Management Plan* (RMP) in 1993. The RMP is a 15-year strategy on where and how BLM will administer public lands within the Redding Resource area, which includes Butte County. In 2016, BLM initiated the Northwest California Integrated Resource Management Plan to replace the current RMP; however, the plan was terminated due to damage in the planning area from the recent wildfires.[45]

c. State of California

The State of California also manages significant land resources in the county, totaling 42,630 acres, as displayed in Figure 1-12. This includes the Lake Oroville State Recreation Area, the Thermalito Forebay/Afterbay, the Oroville Wildlife Area, the Gray Lodge Wildlife Area, Chico State University, Bidwell-Sacramento River State Park, Table Mountain Reserve and over 750 miles of rivers and streams.

G. Federal and State Laws

A number of State and federal laws affect land use and development in Butte County.

1. Federal Laws

The federal laws that influence land use in Butte County are summarized in this section.

a. Federal Aviation Administration

The Federal Aviation Authority (FAA) guides the establishment of height, safety, and noise standards for properties close to airports. As described in Section I.E.4, the Airport Land Use Compatibility Plan for Butte County was adopted in 2017. California Government Code, Section 65302.3, requires local governments to update their general plans, specific plans, and land use regulations to be consistent with the airport land use plan. Proposed new and amended general plans, specific plans, land use ordinances, regulations, and facility master plans must be submitted to the airport land use commission for review.

[45] U.S. Bureau of Land Management, Northwest California Integrated Resource Management Plan, https://eplanning.blm.gov/eplanning-ui/project/63960/510, accessed February 20, 2021.

b. National Historic Preservation Act of 1966

The National Historic Preservation Act (NHPA) was enacted to prevent unnecessary harm to historic properties (16 United States Code [U.S.C.] Sections 470 et seq.). It includes regulations that apply specifically to federal land-holding agencies, but also includes regulations (Section 106) that pertain to all projects funded, permitted, or approved by any federal agency that has the potential to affect cultural resources. Provisions of the NHPA establish a National Register of Historic Places (the National Register is maintained by the National Park Service), the Advisory Council on Historic Preservation, State Historic Preservation Offices, and federal grants-in-aid programs.

c. National Environmental Policy Act of 1969

The National Environmental Policy Act (NEPA) was established to ensure that the potential impacts of a proposed federal action are subject to an environmental review process, which includes how alternatives will impact the human and natural environment (16 U.S.C. Sections 4331 to 4335). These assessments must be made available to the public. Section 102, Title I, requires agencies to incorporate environmental considerations into their planning and decision-making through a systematic approach. Specifically, all agencies must prepare detailed statements assessing the environmental impact of and alternatives to major actions that significantly affect the environment. Both NEPA and CEQA encourage a joint federal and State review when a project requires both federal and State approvals.

2. State Laws

The State laws that influence land use in Butte County are summarized in this section.

a. General Plan Law

California Government Code, Section 65300, regulates the substantive and topical requirements of general plans. State law requires each city and county to adopt a general plan "for the physical development of the county or city, and any land outside its boundaries which bears relation to its planning." The California Supreme Court has called the general plan the "constitution for future development." It expresses the community's development goals and embodies public policy for the distribution of future land uses, both public and private.

Since the general plan affects the welfare of current and future generations, State law requires that it take a long-term perspective (typically 15 to 25 years). The general plan projects conditions and needs into the future and establishes long-term policy for day-to-day decision-making.

State law requires general plans to address eight mandatory elements (or topics): land use, circulation, housing, conservation, open space, noise, safety, and environmental justice. Jurisdictions may also adopt additional elements that cover topics outside the seven mandated elements (such as economic development or historic preservation). In addition to including mandatory elements, a general plan must be internally consistent. As described by State law, internal consistency holds that no policy conflicts can exist, either textual or diagrammatic, between the components of an otherwise complete and adequate general plan. Different policies must be balanced and reconciled within the plan.

b. Senate Bill 1000

The California Environmental Protection Agency (CalEPA) defines Environmental Justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." The State of California recognizes that environmental justice disparities are a threat to overall quality of life across all communities and has developed various policies, including Senate Bill (SB) 1000, to identify and address these environmental justice disparities. SB 1000 was passed in 2016 and serves three important purposes: reducing harmful pollutants and associated health risks in identified disadvantaged communities, promoting equitable access to health-inducing benefits, and promoting transparency and public engagement.

Through SB 1000, the State mandates that jurisdictions concurrently updating two or more elements of their general plan must identify "disadvantaged communities," engage stakeholders in these communities, and adopt either an Environmental Justice (EJ) element or integrate EJ policies throughout the general plan to reduce unique and compounded health risks and pollution burdens. The final EJ element or EJ integrated policies must address at least the five following health and environmental justice outcomes: reduction of existing and future pollution exposure to all neighborhoods, including improvement of air quality; promotion of public facilities and infrastructure; promotion of access to healthy and fresh food; promotion of safe and sanitary homes; and promotion of opportunities for increased physical activity.

c. Identification of Disadvantaged Communities

The Governor's Office of Planning and Research provides guidance for implementing SB 1000 at the local level. Additionally, the Office of the Attorney General provides monitoring and compliance review of SB 1000. These State agencies recommend two methods for the identification of disadvantaged communities (DACs): identifying low-income census tracts or block-groups, or identifying DACs using CalEnviroScreen3.0, a more comprehensive index that combines 20 different indicators of environmental justice.

The tool is currently in its third iteration (CES 3.0) and the California Office of Environmental Health Hazard Assessment (OEHHA) has produced publicly available maps, data tables, and reports that show the statewide distribution of CES 3.0 scores. All information is available through the CalEnviroScreen webpage on the OEHHA website. Census tracts with CES 3.0 scores that are in the percentile range of 75 to 100 are considered disadvantaged communities.

d. Specific Plan Law

California Government Code, Section 65451, regulates the substantive and topical requirements of specific plans. A specific plan is a tool for the systematic implementation of the general plan, similar to zoning regulations, and establishes a link between implementing policies of the general plan and individual development proposals. A specific plan differs from zoning in that it applies to a defined geographic area and has tailored development regulations. A specific plan may be as general as setting forth broad policy concepts, or as detailed as providing direction on every facet of development, from the type, location, and intensity of uses to the design and capacity of infrastructure.

e. Housing Element Law

The State has established detailed legal requirements for the general plan housing element beyond Section 65300. California Government Code Section Article 10.6 requires each city and county to prepare and maintain a current housing element as part of the community's general plan to attain a statewide goal of providing "decent housing and a suitable living environment for every California family." Under State law, housing elements must be updated every eight years and reviewed by the California Department of Housing and Community Development.

f. 2017 Housing Package

In 2017, the State passed a "Housing Package" of 15 bills to remove government barriers to housing production across the state. Some of those bills address land use planning decisions and streamline local development review:

- **Assembly Bill (AB) 1397.** Requires counties to remove sites from their inventory of land identified for residential development that have been included in the past two housing element cycles and have yet to undergo development. The lack of development on these sites signals to the State that the site may have nongovernmental constraints to housing production, such as high land costs or topographic constraints. Therefore, housing element site inventories are limited to vacant sites that have realistic and demonstrated potential to meet the county's Regional Housing Needs Allocation (RHNA).

- **SB 35.** Establishes streamlining procedures for affordable housing and mixed-use projects under certain conditions. When a jurisdiction has met its RHNA goal for above-moderate-income housing, developments must feature 50 percent below-market-rate units to qualify for streamlining. If a jurisdiction has not satisfied its RHNA goal for above-moderate-income housing, at least 10 percent of the units must be below market rate to qualify for streamlining. A qualifying project must also: be on land zoned for residential or mixed uses, not be in an ecologically sensitive area, be multifamily, and pay union wages to construction workers.

- **AB 73.** Encourages local governments to create housing sustainability districts with specified minimum amounts of lower-income housing at the plan and project levels. Housing projects that meet the affordability and other requirements of the sustainability district and pay prevailing wage (in the case of private projects), are entitled to ministerial approval. In addition, AB 73 requires preparation of an EIR for a sustainability district to pre-exempt housing projects subject to environmental review.

- **SB 166.** Prohibits a jurisdiction from diverting from its State-approved site inventory to permit projects that will lead to an inability to meet its RHNA. This essentially prohibits any downzoning of all residential parcels in the county.

- **AB 1505.** Authorizes local cities and counties to enact inclusionary rental housing programs.

- **SB 540.** Allows identification of Workforce Housing Opportunity Zones in a specific plan. This allows counties to augment public engagement, streamline permitting, and perform preemptive environmental reviews, thereby allowing ministerial approval of housing projects.

g. California Environmental Quality Act

The State legislature established CEQA to set a framework for maintaining "a quality environment for the people of the state now and in the future." CEQA consists of both the statutory regulations in Public Resources Code Sections 21000 et seq. and the CEQA Guidelines in California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000 et seq. Though the primary purpose of environmental review under CEQA is public disclosure, Section 15064.5 of the CEQA Guidelines requires lead agencies to determine whether proposed projects that require discretionary government approval clearly identify ways to avoid or reduce environmental damage through feasible mitigation or project alternatives.

h. California Register of Historical Resources

On September 27, 1992, AB 2881 was signed into law amending the Public Resources Code as it affects historical resources. This legislation, which became effective on January 1, 1993, also created the California Register of Historical Resources (CRHR). Under CRHR, a historical resource may be determined significant under one or more of the following four criteria: it is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; it is associated with the lives of persons important to local, California, or national history; it embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or it has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Integrity is the authenticity of a historic resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. All resources nominated for listing on the CRHR must have integrity. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historic resources and to convey the reasons for their significance. Integrity is evaluated regarding the retention of location, design, setting, materials, workmanship, feeling and association. It must also be judged with reference to the particular criteria under which a resource is proposed for eligibility. Alterations over time to a resource or historical changes in its use may themselves have historic, cultural, or architectural significance.

It is possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register. A resource that has lost its historical character or appearance may still have sufficient integrity for the California Register if it maintains the potential to yield significant scientific or historic information or specific data.

i. Senate Bill 18

SB 18 requires cities and counties to conduct consultations with Native American tribes before local officials adopt or amend their general plans (Chapter 905, amends California Civil Code Section 815.3, "Traditional Tribal Cultural Places"). These consultations are for preserving or mitigating impacts to Native American historic, cultural, and sacred sites, features, and objects in a city or county. A tribe has 90 days from the date of contact to request a consultation unless the tribe agrees to a shorter time frame. SB 18 also added a new topic that must be addressed in the open space element—open space land for the protection of Native American historic, cultural, or sacred sites, features, or objects.

II. EXISTING LAND USE

This section describes the existing land uses within the county. It first describes the physical form and setting that have influenced patterns of land use and development. The section then goes on to describe the distribution of major land use types in the county, as well as patterns of land ownership.

A. Physical Environment

This section describes the structure and appearance of Butte County's physical environment. The physical environment is a key component affecting existing patterns of land use and planning for future county growth, since in many instances these conditions set constraints to development and land use. Further, the county's physical environment contributes directly to the unique character of its different landscape areas, and the desirability of the county as a place to live and work.

Physical form and visual character are the result of the interaction of natural and man-made elements. Natural elements, including topography, hydrology, vegetation and climate, create the basic physical context. Human-made elements, including buildings, roads, infrastructure and settlement patterns are secondary elements that establish a particular physical or visual environment. Planning can influence the interaction between the natural and the man-made elements, and help to establish a balance which enhances the quality of life for county residents and visitors.

In the rural setting of Butte County, prominent geographic features, such as mountains, hills and rivers, give shape and profile to the natural environment. Climate, vegetation, and geography interact to differentiate sub-regional landscape units within the larger environmental context. The following discussion identifies five major categories of natural features which contribute to the overall visual and scenic quality of Butte County, including the valley, mountains/timberlands, foothills, water bodies and unique landforms. The major topographic areas are illustrated in the shaded relief mapping shown in Figure i-2, in the introduction to this Setting and Trends Report.

1. Valley

The western portion of the county is in the northeastern Sacramento River Valley. This valley area, which constitutes 45 percent of the total county area, consists of the Sacramento River Valley floor and associated alluvial fans. The topography is quite gentle and flat, with elevations ranging from 60 to 200 feet above sea level. The level topography contributes to a very open and uniform visual character, with natural waterways and canals, and associated levees, providing perhaps the most dominant landscape features. Natural vegetation in the area consists of valley grasslands, valley oak woodlands, freshwater marshes and vernal pools. The landscape is distinguished by its near-level terrain and relative absence of major vertical features. The openness of the landscape means that distant features such as the Sutter Buttes to the south and the Coast Ranges to the west become important visual elements, although they are not located in Butte County. Views to the county's eastern foothills are also prominent. Within the valley area, the most prominent human-made features are the scattered rural residential units and agricultural-industrial facilities such as processing plants, as well as the urban and suburban landscapes associated with the valley floor communities of Chico, Gridley, Biggs and Oroville.

2. Foothills

The foothills form a transitional area between the valley floor on the west and the mountains on the east. This area, which occupies approximately 25 percent of the county's land area, consists of extensive rolling foothills with elevations ranging from about 200 to 2,100 feet above sea level. Foothill oak woodland, intermixed and alternating with chaparral, forms a transitional region between the valley grasslands and the mountain forests. In visual terms, the foothills form a distinct and highly attractive landscape which is more varied in topography and vegetation than the valley.

The visual character of the foothills is also less open than the valley, although viewpoints within the foothill area provide sweeping panoramas of the valley area and beyond. The rolling topography creates identifiable subunits within the area, which are frequently punctuated by distinctive clusters of oaks or landforms such as Table Mountain.

3. Mountains/Timberlands

Approximately 30 percent of the county is a mountainous area formed by the southern portion of the Cascade Mountain Range and the western slopes of the Sierra Nevada. Elevations range from 2,100 feet to over 6,000 feet above sea level. Elevations are generally lower in the Sierras than in the Cascades within Butte County, but slopes are generally steeper in the Sierras. The mountain areas, and the foothill areas to the west, have deep-cut canyons, such as those seen along Butte Creek and parts of the eastern Feather River, which were formed by streams and rivers flowing westward from the glacial areas of geologic times. The combination of canyons and high mountains creates some of the county's most visually stunning and environmentally sensitive lands. In addition to being topographically distinct, the mountain areas are also clearly distinguished by the vegetative patterns which are much more dense and lush than elsewhere in the county. The mountain areas are heavily forested with coniferous forest, mixed evergreen forest, montane meadow, and montane riparian environments.

The Feather River Canyon is quite famous, not only for scenic quality but also for its man-made features such as the Western Pacific Railroad line, known as the "Feather River Route," as well as water/power plants and historical gold mining.

The mountain areas are predominantly natural and highly scenic in character with dispersed human activities and modification throughout the area. The road network, including State highways, county roads, logging roads and private residential roads, influences the area's visual character, because most roads have required the alteration of topography or vegetation to accommodate them within the rugged terrain.

4. Waterbodies

Butte County has an abundance of water resources that contribute to the county's visual character. Butte County is part of the Sacramento River Basin watershed, and is bounded by the Sacramento River on its west side. Numerous streams and rivers drain runoff from the Sierra Nevada and Cascades southwesterly across the county into the Sacramento River. Of these waterways, the most significant are Butte Creek, Big Chico Creek, and the North, Middle and South Forks of the

Feather River. These waterways are significant visual features within the county even though visual access to them is relatively limited because of the terrain through which they pass.

More dominant as visual features are the county's surface water bodies. Few natural lakes exist in the county, although numerous reservoirs have been built to provide domestic and irrigation water, hydroelectric power, recreation, flood control and watershed management. The most visually significant of the county's water bodies, because of their location and size, are Lake Oroville and the Thermalito Forebay and Afterbay. Other reservoirs that are important features include: Concow Reservoir, Paradise Lake, Magalia Reservoir, Philbrook Reservoir, Lake Madrone, Ponderosa Reservoir, Lake Wyandotte, Round Valley Reservoir, Lost Creek Reservoir and Sly Creek Reservoir.

5. Unique Landforms and Habitat Areas

The county has a number of areas or features, that while a part of a larger landscape unit, are distinctive enough to contribute unique qualities. These areas and features generally consist of landforms and habitat areas. Unique landforms are those whose geologic features clearly distinguish them from their surroundings. As landmarks and reference points, they provide orientation and an immediate sense of place. Unique landforms of this type in Butte County include the steep river canyons of the mountain and foothill areas, such as Feather River Canyon, Chico Canyon and Butte Creek Canyon. Table Mountain and the smaller steep sided buttes in the Lime Saddle area give a special signature character to the foothill area in the heart of the county, and various peaks throughout the eastern portion of the county provide identifiable landmarks (e.g., Big Bar Mountain, Bald Rock Dome and Sugarloaf). As noted above, the Sutter Buttes, while located outside of Butte County, are important regional landscape forms because they can be seen from across the entire length of the county. Additionally, Mount Shasta, Mount Lassen and the Coast Range can be seen from many portions of the county.

Especially unique or sensitive habitat areas in the county that are also visually important include the three large wildlife management areas: the 9,100-acre Gray Lodge Wildlife Area west of Gridley, the Table Mountain Reserve north of Oroville and the 11,800-acre Oroville Wildlife Area located primarily along the Feather River and Thermalito Afterbay grassland area in the Oroville area. These areas, which provide habitat for migratory waterfowl and resident populations of smaller mammals and birds, also provide large natural-looking areas that are free from the cultivation and development that mark valley lands that surround them. In addition to these two large discrete areas, there are also many important wetlands and riparian areas along the Sacramento River that make positive visual contributions to the county.

B. Existing Land Use

Broadly speaking, existing land use in Butte County as a whole can be divided into two major types: open space uses, including agriculture, natural resource, and public and recreation lands, which constitute the vast majority of the county's unincorporated areas; and urban uses, primarily associated with the five major incorporated communities, and the unincorporated towns and villages that are scattered throughout the county. Historically, overall land use patterns in Butte County have been closely related to the natural characteristics of the county's main geographic areas, with concentrations of population located in proximity to the most richly productive agricultural resources of the valley floor, and more scattered populations in the foothill and mountain regions.

Table 1-2 presents approximate existing land use acreage by generalized land use types for the entire county, as of 2016. While this table reports the latest available data set, the information pre-dates the Camp Fire (2018) and North Complex Fire (2020), which destroyed significant areas of developed uses. The total land area of Butte County is approximately 1,680 square miles (1,073,200 acres).[46] As shown in the table, farmland and grazing lands account for almost 60 percent of all land in the county. "Other land" is the next largest area; this category includes low-density rural developments, vacant and nonagricultural land greater than 40 acres surrounded on all sides by urban development, vegetative areas not suitable for livestock grazing, strip mines, confined animal agriculture facilities, borrow pits, and water bodies smaller than 40 acres.[47] Urbanized and developed land (i.e., residential, commercial, and industrial development) accounted for approximately 4 percent of the total area at the time of this quantification.

[46] Butte County Geographic Information Systems, February 2021

[47] California Department of Conservation, 2014-2016, *California Farmland Conversion Report, Page 8*.

TABLE 1-2 ACREAGE BY GENERALIZED LAND USE TYPES BUTTE COUNTY 2016

Category	Acreage	% of County
Urban or Developed	46,644	4.3%
Grazing Land	400,146	37.3%
Farmland	237,414	22.1%
Water	23,048	2.1%
Other Land	365,946	34.1%
Total	**1,073,198**	**100.0%**

Source: 2016 Farmland Mapping & Monitoring Program.

1. Open Space Land Uses

Various sorts of open space land uses constitute the majority of the unincorporated county and form the basis for the productive industries (agriculture, mining and forestry) that lie at the heart of the local economy. Each of the three principal terrain areas within the county, valley, foothills, and mountains, has provided a context for the nature of the open space and natural resources found there. The following subsections describe those open space land uses using these three major topographic divisions as an organizing framework.

The productive industries associated with each area are frequently non-transferable economic activities; that is, they are highly dependent upon the preservation of local geographic and land use conditions. For example, the cultivation of almonds and other orchard crops, a major industry in Butte County, is dependent on the deep rich soils of the valley in order to thrive, and the timber industry is dependent on the forests in the higher altitudes of the east county.

a. Valley

Butte County has been, and continues to be, a predominantly rural, agricultural county. Two kinds of agricultural activity occur in the county: (1) cultivation of row and field crops (field, seed, vegetables), orchard and tree products (fruit and nut), nursery stock, and apiary (bee and honey); and (2) grazing/animal husbandry, a category that includes livestock ranching and all aspects of animal husbandry.

The valley area, which consists of rich alluvial bottom lands of the Sacramento River Valley, is predominantly agricultural in character. Most of the intensive agriculture in the county occurs here, due to the availability of level topography, prime cultivable soils, and excellent drainage. In 2016, approximately 192,000 acres of county land were used for intensive agriculture,[48] mainly to grow rice, almonds, prunes, and walnuts. An additional 400,000 acres were devoted to grazing lands.[49] Numerous agricultural processing facilities are found throughout the valley area.

b. Foothills

Open space land use activities in the foothills are concentrated in three principal industries: "extensive" agriculture, mining, and recreation. Extensive agriculture (irrigated pasture, grazing, and animal husbandry) is a major land use in the county. A significant portion of the county is used at least part of the year for grazing cattle, sheep, goats, and other livestock on natural vegetation. Generally, however, extensive agricultural activities occur between the elevations of 200 and 2,100 feet above sea level where the rolling topography and poor soils are unsuitable for raising crops.

Mining of mineral resources represents another important land use in Butte County, and most of this activity takes place in the foothills, with the greatest concentrations of mines and mining operations located north of Oroville near Highways 70 and 149. South of Oroville, the Palermo and Honcut-Bangor areas also contain large numbers of mining operations. Sand, gravel, and stone constitute the most important mineral resources in the county.

Recreational uses in the foothills are connected primarily with major water resources such as Lake Oroville, Thermalito Forebay and Afterbay, and the Feather River. These areas are major recreational attractions for both county residents and visitors each year.

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[48] State of California, Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program, *Butte County 2014-2020 Land Use Conversion Table A-3*.

[49] State of California, Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program, *Butte County 2014-2020 Land Use Conversion Table A-3*.

c. Mountains

Land use in the mountains area reflects the area's abundance of natural resources. Chief among these are forests, minerals, water, and wildlife. The area's scenic beauty has also created the base for an important tourism and recreation industry.

Pine and fir forests ("timberlands") dominate the mountains area of the county and support the wood products industry. The total wages for agriculture, forestry, fishing, and hunting account for 3.7 percent[50] of the wage and salary employment in the county and contribute significantly to the local economy. The mountains and forests also contain significant wildlife habitat and watershed protection areas.

Sites for outdoor recreation include portions of two national forests (Plumas and Lassen), as well as the Feather Falls Scenic Area and parkland along the Middle Fork of the Feather River

2. Urban Land Uses

Historically, urban lands (i.e., residential, commercial, and industrial uses, generally served by public sewer and water systems) have constituted a proportionally small share of total land area in Butte County, although it is a share that is increasing annually. The Division of Land Resource Protection in the California Department of Conservation, through its Farmland Mapping and Monitoring Program (FMMP), reported that "urban and built-up land" land uses occupied 72.9 square miles or 4.3 percent of all county land in 2016.

Most of the county's urban land uses, including four of five of the incorporated municipalities, are in the valley region. Many other small farming and ranching towns developed within the valley floor, reflecting the rich agricultural soils and mild climate, proximity to transportation links for goods transportation, and available water supply.

Urban uses in the foothills are concentrated in and adjacent to the incorporated communities of Paradise and Oroville, which has grown to the east to encompass both valley and foothill areas. The slopes east of Oroville have attracted both rural and urban development. In the Paradise area, development prior to the 2018 Camp Fire was dispersed over the ridges within the Town of Paradise and in the unincorporated communities to the north. Although no major urban settlements are in the mountains, smaller communities are distributed throughout the area,

[50] State of California, Economic Development Department, Wages by Occupation and Industry, *Quarterly Census of Employment and Wages 1st Quarter 2020.*

including many former mining camps that are now centers of rural residential development or linked to the tourism industry.

a. Incorporated Cities and Towns

Table 1-3 shows the estimated acreage of incorporated lands, their SOIs, and unincorporated lands in the county in 2000 and 2021. The areas shown in the table were calculated from Butte County's or local jurisdictions' GIS data. As shown in the table, there was a significant increase in the total unincorporated county land within an SOI boundary during this period. As described in Section I.D.2, over the past two decades, the SOI boundaries for all five municipalities in the County have been amended by LAFCO. The largest SOI boundary change occurred in the City of Chico, which has increased from 6,433 acres in 2000 to 28,083 acres in 2021.

TABLE 1-3 DISTRIBUTION OF MUNICIPAL AND COUNTY LAND – BUTTE COUNTY 2021

	2000 Acreage		2021 Acreage		Growth: 2000-2021 Acreage Change	
	Acres	**% of County Total**	**Acres**	**% of County Total**	**Acres**	**% of Change**
Biggs Total – SOI and Incorporated	525	0.05%	2,734	0.25%		
Incorporated	334	0.03%	400	0.04%	66	20%
Unincorporated in SOI	191	0.02%	2,333	0.22%	2,142	1,122%
Chico – SOI and Incorporated	24,444	2.28%	49,347	4.60%		
Incorporated	18,012	1.68%	21,264	1.98%	3,252	18%
Unincorporated in SOI	6,433	0.60%	28,083	2.62%	21,650	337%
Gridley – SOI and Incorporated	1,738	0.16%	4,054	0.38%		
Incorporated	922	0.09%	1,438	0.13%	516	56%
Unincorporated in SOI	816	0.08%	2,616	0.24%	1,800	221%
Oroville – SOI and Incorporated	26,499	2.47%	42,610	3.97%		
Incorporated	7,804	0.73%	8,866	0.83%	1,062	14%
Unincorporated in SOI	18,695	1.74%	33,744	3.14%	15,049	80%
Paradise – SOI and Incorporated	29,133	2.72%	40,753	3.80%		
Incorporated	11,631	1.08%	11,542	1.08%	-89	-1%
Unincorporated in SOI	17,502	1.63%	29,211	2.72%	11,709	67%
Unincorporated County Outside of SOIs Only	990,597	92.33%	933,702	87.00%		
Unincorporated County Total	1,034,232	96.39%	1,029,689	95.95%	-4,543	-0.4%
Unincorporated County Inside SOIs	43,636	4.07%	95,988	8.94%	52,352	120%
Total Butte County	**1,072,935**	**100.00%**	**1,073,200**	**100.00%**		
Total SOIs and Incorporated	82,339	7.67%	139,498	13.00%		
Total Incorporated	38,703	3.61%	43,511	4.05%	4,808	12%
Total SOIs Only	43,636	4.07%	95,988	8.94%	52,352	120%

Sources: Butte County GIS Services, 2021

b. Unincorporated Rural Communities

In addition to the five incorporated communities, there are a large number of smaller population centers and rural unincorporated towns and villages located throughout the county. Many of these are distinct centers, formed around historic mining, logging, or farming communities; others have developed on the edges of larger incorporated cities and towns, through creation of new subdivisions.

c. Scattered Rural Development

Low density rural residential, agricultural-industrial, and scattered commercial development is dispersed throughout the unincorporated areas. Residential development mostly consists of single-family residences, many of which are associated with active farming activities on the same or adjacent parcels. Some smaller parcels, often referred to as rural ranchettes, have been converted into rural home sites where active farming has been discontinued.

Small industrial/commercial complexes, many of which provide ancillary services to agricultural uses (e.g., feed or machinery sales, well-drilling services, and spray operations), or provide food processing, are also found in dispersed locations. Gas stations, small food markets, local-serving retail stores and professional offices also make up some of the non-residential scattered rural land uses.

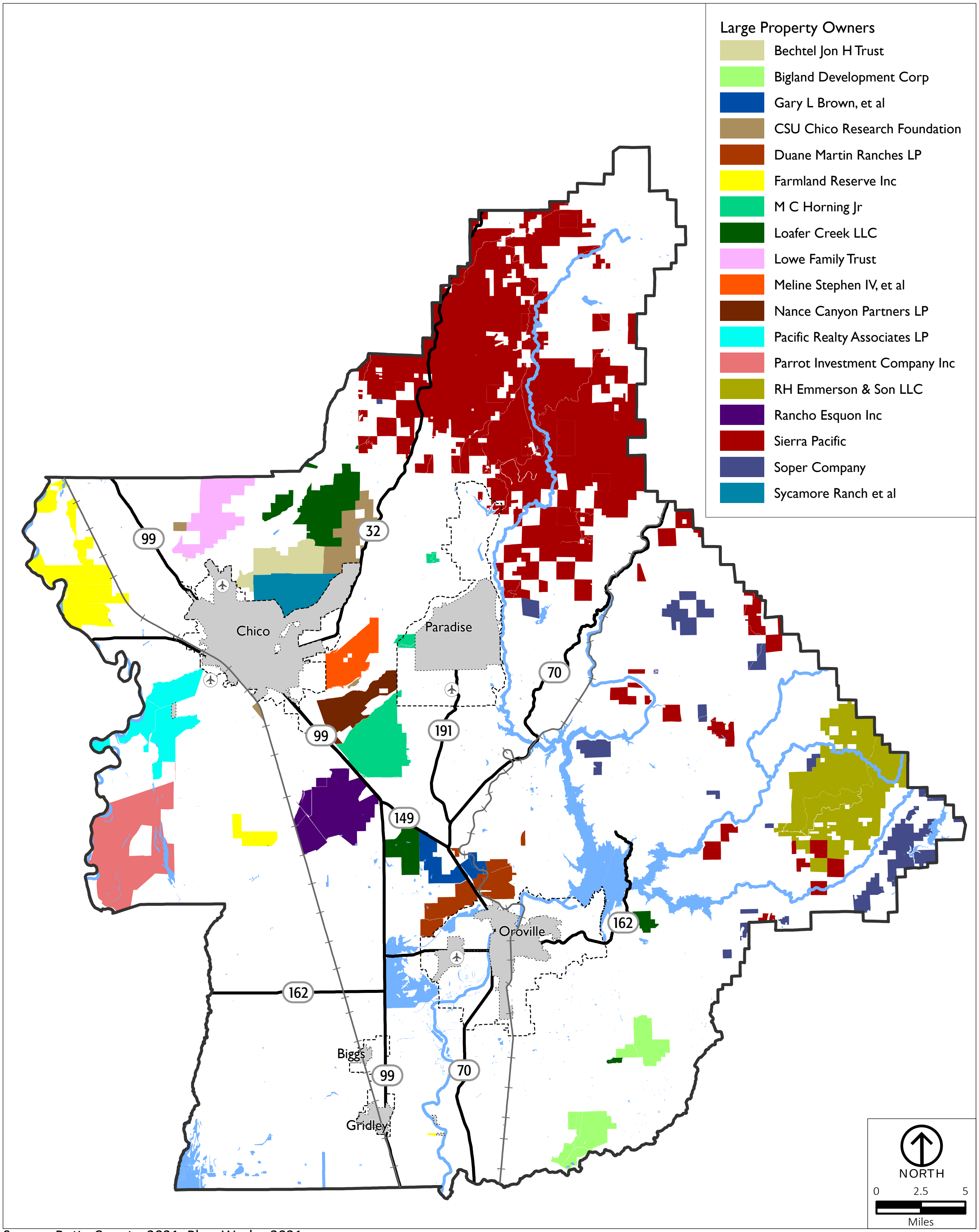
C. Land Ownership Patterns

As described in Section I.F of this chapter, federal and State agencies own significant amounts of land in Butte County. However, the majority of the county is privately owned. Figure 1-13 displays the landholdings of the large property owners in Butte County, which are primarily used for timber and agricultural purposes.

Sierra Pacific Industries, a timber company, is the largest private property owner in Butte County, with most of its land holdings concentrated around Lassen National Forest in the northern portion of the county. Sierra Pacific was founded by R.H. Emmerson, who also holds significant landholdings near the easternmost tip of the county through the limited liability company R.H. Emmerson & Son LLC. Soper Company, another timber company, owns scattered parcels of land in the mountainous eastern portion of Butte County.

In the foothills, the majority of the parcels held by large landowners are used for grazing purposes, and are typically held in a more clustered pattern than in the mountains. However, Loafer Creek LLC, one of the largest of the foothill area landowners, does owns parcels scattered throughout the region, primarily for grazing purposes.

In the valley, the majority of the parcels held by large landowners are used for field and row crops, nuts, fruit, and rice. The Parrott Investment Company, Inc. and Farmland Reserve, Inc. are the largest of these valley property owners.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE 1-13

LARGE PROPERTY OWNERS

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2 POPULATION, HOUSING AND EMPLOYMENT

A. Introduction

This section presents information on both existing and projected population, housing, and employment within Butte County, and describes the effects of the proposed General Plan on these factors. In recent years, Butte County[1] has seen a decrease in population and households due to the 2018 Camp Fire, which destroyed nearly 14,000 homes, and the 2020 North Complex Fire, which destroyed 2,455 structures, including many homes.[2,3] Housing production will be a high priority for the County through the General Plan horizon. In addition, the data shows that the population in Butte County is older than the rest of the state, indicating the need for housing that is suitable for seniors. As more retirees from outside the area move into the county, they will require smaller housing units as well as access to retail and health care amenities, providing the county with opportunities to generate additional jobs in the construction, retail, and health care industries.

B. Population and Housing Trends

The following data concerning the characteristics of unincorporated Butte County illustrate a potential demand for new development as a result of the recent wildfires. However, the long-term effects of the Camp and North Complex Fires are not fully known, particularly regarding how many displaced residents will ultimately return. Table 2-1 provides an overview of population and housing changes, average household size, household type, and household tenure for unincorporated Butte County, Butte County at large, and the State of California. To the extent possible, the current data reported reflects the impacts of the Camp Fire. However, for some metrics, the Census Bureau's American Community Survey (ACS) 2019 5-year data estimates were determined to be the best source of information; these estimates are determined using data inputs from 2015 through 2019 and therefore do not reflect the full impact of the 2018 Camp Fire or any impact of the 2020 North Complex Fire.

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[1] Butte County refers to the entire County, including the incorporated cities.

[2] Butte County District Attorney, *The Camp Fire Public Report: A Summary of the Camp Fire Investigation*, June 16, 2020, https://www.buttecounty.net/Portals/30/CFReport/PGE-THE-CAMP-FIRE-PUBLIC-REPORT.pdf?ver=2020-06-15-190515-977

[3] North Complex Fire: U.S. Forest Service, Plumas National Forest, North Complex Fire Update, December 4, 2020, https://inciweb.nwcg.gov/incident/6997/

TABLE 2-1 POPULATION AND HOUSEHOLD TRENDS, 2010 – 2019

	Unincorporated Butte County			Butte County			State of California		
	2010	**Current***	**Percentage Change**	**2010**	**Current***	**Percentage Change**	**2010**	**Current***	**Percentage Change**
General									
Population	83,758	67,640	-19.2%	220,000	210,291	-4.4%	37,253,956	39,782,870	6.8%
Households	32,526	30,435	-6.4%	87,618	85,320	-2.6%	12,577,498	13,044,266	3.7%
Persons Per Household	2.56	2.34	-8.9%	2.45	2.56	4.3%	2.90	2.93	1.2%
Housing Units	36,587	31,991	-12.6%	95,835	86,122	-10.1%	13,670,304	14,329,863	4.8%
Household Type									
Families	69.3%	68.3%		60.0%	60.3%		68.7%	68.7%	
Nonfamilies	30.7%	31.7%		40.0%	39.7%		31.3%	31.3%	
Households with Children									
Households with Children Under 18	28.0%	25.3%		27.3%	26.0%		37.0%	34.0%	
Households without Children Under 18	72.0%	74.7%		72.7%	74.0%		63.0%	66.0%	
Tenure									
Owner	74.0%	75.7%		58.2%	59.0%		55.9%	54.8%	
Renter	26.0%	24.3%		41.8%	41.0%		44.1%	45.2%	

Notes: **"Current"** data is from 2019 or 2020.
Except for Households, data layers under "General" are sourced from 2020 Department of Finance (DOF) Table E-5 for 2010 (2010) and 2020 (Current).
All other **"Current"** data is from American Community Survey (ACS) 2019 5-year data estimates.
Sources: U.S. Census, 2010; ACS, 2019 5-year data estimates; California Department of Finance, 2020.

1. Population and Household Trends

According to DOF data, the population of unincorporated Butte County decreased significantly between 2010 and 2020. Compared to a population gain of 6.8 percent in the state and a decrease of 4.4 percent in the overall county, the unincorporated population declined by 19.2 percent, from 83,758 to 67,640. Similarly, the unincorporated county saw a 6.4-percent decrease in total households relative to a 3.7-percent increase and a 2.6-percent decrease of households in the state and overall county, respectively.

The unincorporated area of the county experienced a net decrease of 4,596 housing units since 2010. Between 2010 and 2018, the units attributed to unincorporated Butte County remained relatively stable, with some years increasing and other years decreasing. Increases were due to new housing development; decreases were often due to municipalities annexing land with existing residential units. Countywide, housing units increased steadily between 2010 and 2018. In 2019 and 2020, unit numbers dropped due to the Camp and North Complex Fires. In the unincorporated county, unit counts dropped by 3,119 units in 2019 and 800 units in 2020.

2. Household Size

Average household sizes for Butte County and the unincorporated portion of the county in 2020 were 2.56 and 2.34 persons per household, respectively. The average household size increased between 2010 and 2020 countywide, but it decreased in the unincorporated area. Between 2010 and 2018, the average household size in the unincorporated county remained relatively stable, averaging 2.55 persons per household (with a low of 2.3 persons per household in 2018 and a high of 2.57 persons per household in 2011). In 2019, the unincorporated county household size increased slightly to 2.59, and then decreased significantly to 2.34 persons per household in 2020. Meanwhile, in the incorporated areas alone, the household size remained very stable between 2010 and 2018, and then increased from 2.37 persons per household in 2018 to 2.80 in 2019 before settling back at 2.69 persons per household in 2020. These data indicate that some displaced residents may have joined households in incorporated parts of the county. As communities impacted by the fires rebuild, the average household size is likely to continue to fluctuate.

3. Household Type

In 2019, 68.3 percent of households in unincorporated Butte County were family households, compared to 60.3 percent countywide and 68.7 percent for the State.[4] In all the areas, these percentages showed little if any change from 2010. The lower ratio of family to non-family households in Butte County relative to the unincorporated region is likely reflective of the large student population from the California State University at Chico that is concentrated within the Chico city limit. Although many of the new family households are likely to be senior households (discussed in Section B.6, Age) that will likely demand higher-density housing,[5] traditional single-family homes will continue to see strong demand from the remaining family household population, particularly from new family households with fewer children. However, as approximately one-third of households consist of singles and unrelated people living together, there will also be strong demand for smaller and/or higher density for-sale units or multi-family rental units.

4. Households with Children

Although the average household size increased in the county and decreased in the unincorporated portion of the county between 2010 and 2019, the shares of households with children in both geographies were relatively stable, with only a minor decrease. In the State, the share of households with children decreased slightly as well. While the demand will remain strong for single-family, for-sale units, families that have fewer children will increase demand for higher-density single-family units.[6]

5. Household Tenure

According to ACS, 75.7 percent of residents in the unincorporated portion of the county own their home compared to only 59 percent countywide. Although both areas have higher than average rates of ownership in the state, the homeownership rate in the unincorporated region eclipses the statewide homeownership rate by over 20 percent, which is most likely the result of a relatively small proportion of

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[4] According to the U.S. Census, a family is a group of two people or more (one of whom is the householder) related by birth, marriage, or adoption and residing together.

[5] Due to the smaller housing unit requirements of senior households and the high cost of housing in California, senior households will likely demand higher density housing units, which are typically more affordable than standard single-family units.

[6] Due to the smaller housing unit requirements of households with fewer people and the high cost of housing in California, smaller households will likely demand higher-density housing units, which are typically more affordable than standard single-family units.

multifamily units, which tend to be for rent, in the unincorporated area. While homeownership rates in the state are slowly decreasing, ownership rates in Butte County are increasing. Homeowner demand has been very strong within the county and should continue to be a primary factor in the local housing market over the General Plan horizon.

6. Age

Table 2-2 shows the age distributions for the unincorporated portion of the county, all of Butte County, and the State of California. Compared to the State, Butte County and the unincorporated portion of the county have a larger share of population over 60. This is especially true within the unincorporated portion of the county, as 30.7 percent of the population is over 60 compared to only 19.7 percent of all of California. In addition, the unincorporated portion of the county has a higher ratio of residents aged 50 to 59. This highlights that unincorporated Butte County in particular attracts a larger proportion of older residents and retirees than the rest of the state. Butte County as a whole also has a large percentage of residents between the ages of 20 and 29 (18 percent) compared to the unincorporated portion of the county (11.9 percent) and the state (14.8 percent), which represents the large college student populations associated with California State University, Chico, and Butte College.

TABLE 2-2 AGE DISTRIBUTION, 2019

2019 Estimated Population by Age	Unincorporated Butte County		Butte County		State of California	
	Number	%	Number	%	Number	%
Age 0 – 9	8,995	11.1%	26,105	11.6%	4,919,754	12.5%
Age 10 – 19	8,458	10.5%	27,305	12.1%	5,140,633	13.1%
Age 20 – 29	9,617	11.9%	40,690	18.0%	5,830,059	14.8%
Age 30 – 39	8,275	10.2%	25,913	11.5%	5,570,748	14.2%
Age 40 – 49	8,898	11.0%	23,389	10.4%	5,088,145	13.0%
Age 50 – 59	11,802	14.6%	27,158	12.0%	5,011,016	12.8%
Age 60+	24,796	30.7%	55,257	24.5%	7,723,142	19.7%
Total	**80,841**	**100.0%**	**225,817**	**100.0%**	**39,283,497**	**100.0%**

Sources: 2019 American Community Survey 5-Year Estimates.

7. Median Household Income

Table 2-3 shows the income distribution and median household incomes for the unincorporated portion of Butte County, all of Butte County, and the State of California.

According to ACS, the 2019 median income for Butte County households was $52,537. The median income statewide was $75,235, which is about $22,700 more than the county's income. Lower household income levels in Butte County combined with increasing housing prices will translate into increased demand for higher density residential units, which tend to be more affordable than traditional single-family detached housing units.

TABLE 2-3 INCOME DISTRIBUTION, 2019

2019 Households by Household Income	Unincorporated Butte County		Butte County		State of California	
	Number	%	Number	%	Number	%
<$10,000	1,455	4.79%	5,972	7.00%	626,125	4.80%
$10,000–$14,999	1,756	5.77%	5,631	6.60%	534,815	4.10%
$15,000–$24,999	3,238	10.65%	9,641	11.30%	978,320	7.50%
$25,000–$34,999	3,095	10.17%	8,703	10.20%	978,320	7.50%
$35,000–$49,999	4,023	13.23%	11,092	13.00%	1,369,648	10.50%
$50,000–$74,999	5,168	16.99%	14,419	16.90%	2,021,861	15.50%
$75,000–$99,999	3,573	11.75%	9,726	11.40%	1,617,489	12.40%
$100,000–$149,999	4,145	13.63%	11,006	12.90%	2,165,348	16.60%
$150,000–$199,999	1,768	5.81%	4,351	5.10%	1,160,940	8.90%
$200,000 or more	2,196	7.22%	4,778	5.60%	1,591,400	12.20%
Total	**30,416**	**100.00%**	**85,320**	**100.00%**	**13,044,266**	**100.00%**
Median Household Income	**-**		**$52,537**		**$72,235**	

Sources: 2019 American Community Survey 5-Year Estimates.

8. Housing Occupancy Patterns

Table 2-4 shows housing vacancy rates in unincorporated Butte County and countywide, which are 13.4 percent and 11.6 percent, respectively. These figures are higher than the State's vacancy rate of 8 percent, likely due to the increased usage of recreational and second homes in Butte County. Homes reserved for seasonal, recreational, or occasional use account for almost 18 percent of the vacant housing stock countywide; in the unincorporated region, this ratio is even higher, at 33 percent. Of the 2,049 seasonal, recreational, or occasional use homes in Butte County, 1,155 (or 76 percent) are located within the unincorporated area. This highlights a potentially strong demand for second homes centered around Lake Oroville's recreational opportunities and elsewhere in the Butte County foothills in general, as well as demand for additional commercial facilities and community facilities to serve these dispersed populations.

TABLE 2-4 HOUSING OCCUPANCY AND VACANCY STATUS, 2019

Occupancy Status	Unincorporated Butte County		Butte County		State of California	
	Number	%	Number	%	Number	%
Occupied	**30,435**	**86.6%**	**85,320**	**88.4%**	**13,044,266**	**92.0%**
Vacant	**4,701**	**13.4%**	**11,185**	**11.6%**	**1,131,710**	**8.0%**
For rent	591	1.7%	2,934	3.0%	219,832	1.6%
Rented, not occupied	440	1.3%	1,733	1.8%	59,017	0.4%
For sale only	459	1.3%	1,034	1.1%	82,668	0.6%
Sold, not occupied	254	0.7%	516	0.5%	53,992	0.4%
For seasonal, recreational, or occasional use	1,555	4.4%	2,049	2.1%	387,973	2.7%
For migrant workers	8	0.0%	8	0.0%	3,459	0.0%
Other vacant [a]	1,394	4.0%	2,911	3.0%	324,769	2.3%
Total	**35,136**	**100.0%**	**96,505**	**100.0%**	**14,175,976**	**100%**

[a] *Other Vacant.* If a vacant unit does not fall into any of the classifications specified above, it is classified as "other vacant."
Sources: 2019 American Community Survey 5-Year Estimates.

9. Labor Force Trends

Table 2-5 shows countywide labor force trends from 2017 to 2020, based on data from the California Employment Development Department (EDD). Employment numbers in Butte County have decreased, likely due in part at least to the 2018 Camp Fire (the impact of the 2020 North Complex Fire is not reflected in the data). The county's labor force decreased from 101,500 in 2017 to 97,800 in 2020, while the state's labor force steadily increased during this time. There has also been a decrease in the number of residents employed in the county, although the number of unemployed residents has also decreased. In 2017, the county's unemployment rate was 7.2 percent and in 2020, the unemployment rate decreased to 5.6 percent; the state's unemployment rate also decreased during this time. The ongoing COVID-19 pandemic has also resulted in significant impacts to certain industries, including closures, which may also impact the county's labor force. See Chapter 3, Economics, for a detailed discussion of labor force and industry trends.

TABLE 2-5 LABOR FORCE TRENDS, 2017 – 2020

	2017	2018	2019	2020	Total % Change
Butte County					
Labor Force	101,500	100,500	100,000	97,800	-3.6%
Employment	94,200	94,600	93,200	92,400	-1.9%
Unemployment	7,400	5,900	6,900	5,400	-27.0%
Unemployment Rate	7.2%	5.9%	6.9%	5.6%	
State of California					
Labor Force	19,052,100	19,111,800	19,346,200	19,477,400	2.2%
Employment	17,983,100	18,211,500	18,416,400	18,637,400	3.6%
Unemployment	1,069,000	900,200	929,800	840,000	-21.4%
Unemployment Rate	5.6%	4.7%	4.8%	4.3%	

Sources: California Employment Development Department, 2020.

10. Commute Patterns

The American Community Survey provides commute data at the countywide level. This data is shown in Table 2-6. As of 2019, the majority of Butte County residents, approximately 89.6 percent, work in the county. Approximately 10 percent of residents work outside of the county, but within California. The remaining 0.4 percent of residents work outside of the state. Due to the COVID-19 pandemic, many employees are working remotely from their homes, reducing the total number of people who commute to any location. The unknown long-term implications of this shift in work locations may include a lasting reduction in the total number of regular commuters.

TABLE 2-6 COMMUTE PATTERNS OF BUTTE COUNTY RESIDENTS

Place of Work	Percentage
Total Inside State of Residence	99.6%
Worked in county of residence	89.6%
Worked outside county of residence	10.0%
Total Outside State of Residence	0.4%
Total Employed	100.0%

Sources: 2019 American Community Survey 5-Year Estimates.

C. Employment Growth Trends and Conditions

Table 2-7 shows the 2018 industry employment figures for Butte County. There were approximately 81,481 jobs in Butte County in 2018. Health care and social assistance accounted for 23.6 percent of all jobs in the county, followed by educational services (12.1 percent), retail trade (11.3 percent), and accommodation and food services (11.3 percent). Concentration levels in the incorporated municipalities mirror countywide trends, although there is a higher percentage of retail trade jobs in the incorporated areas. In the unincorporated portion of the county, the agriculture, forestry, fishing, and hunting sector provided the highest concentration of jobs (17.4 percent), followed by educational services (15.1 percent) and construction (11.6 percent) sectors. The COVID-19 pandemic has deeply impacted industries and jobs locally and across the globe. Manufacturing and retail sectors are among the sectors most acutely impacted by the pandemic and that constitute a significant portion of the region's 2018 jobs. The pandemic and will likely result in lasting change to employment patterns in the region. See Chapter 3, Economics, for a detailed discussion of employment growth trends and conditions, including impacts from the pandemic.

TABLE 2-7 BUTTE COUNTY EMPLOYMENT BY INDUSTRY, 2018

	Total County		Incorporated		Unincorporated	
Industry Sectors	**Employment**	**Share**	**Employment**	**Share**	**Employment**	**Share**
Agriculture, Forestry, Fishing, and Hunting	2,963	3.6%	519	0.8%	2,444	17.4%
Mining, Quarrying, and Oil and Gas Extraction	48	0.1%	34	0.1%	14	0.1%
Utilities	576	0.7%	425	0.6%	151	1.1%
Construction	4,423	5.4%	2,793	4.1%	1,630	11.6%
Manufacturing	4,110	5.0%	3,028	4.5%	1,082	7.7%
Wholesale Trade	2,068	2.5%	1,313	1.9%	755	5.4%
Retail Trade	9,187	11.3%	8,540	12.7%	647	4.6%
Transportation and Warehousing	812	1.0%	558	0.8%	254	1.8%
Information	830	1.0%	658	1.0%	172	1.2%
Finance and Insurance	1,987	2.4%	1,901	2.8%	86	0.6%
Real Estate and Rental and Leasing	1,395	1.7%	1,187	1.8%	208	1.5%
Professional, Scientific, and Technical Services	2,370	2.9%	2,042	3.0%	328	2.3%
Management of Companies and Enterprises	622	0.8%	622	0.9%	0	0.0%
Administration & Support, Waste Management and Remediation	2,913	3.6%	2,423	3.6%	490	3.5%
Educational Services	9,835	12.1%	7,718	11.4%	2,117	15.1%
Health Care and Social Assistance	19,200	23.6%	17,595	26.1%	1,605	11.4%
Arts, Entertainment, and Recreation	1,429	1.8%	1,197	1.8%	232	1.7%
Accommodation and Food Services	9,184	11.3%	7,886	11.7%	1,298	9.2%
Other Services (excluding Public Administration)	3,795	4.7%	3,482	5.2%	313	2.2%
Public Administration	3,734	4.6%	3,514	5.2%	220	1.6%
Total	**81,481**	**100.0%**	**67,435**	**100.0%**	**14,046**	**100.0%**

Sources: U.S. Census Bureau OnTheMap, Center for Economic Studies, LEHD 2018

D. Population, Housing, and Employment Projections

The following section presents available population, household, and employment projections and discusses the data sources' historic reliability. To determine the amount and types of development that the county may demand through the General Plan horizon, the county must know the amount and types of population and employment growth likely to occur over the General Plan horizon. The Butte County Association of Governments (BCAG) projected population and housing for the entire county and each of the cities within the county through 2045. Table 2-8 shows BCAG's population, housing unit, and household projections through 2045.

1. Population Projections

According to DOF, there were 210,291 people living in the county in 2020. Of this total, approximately 142,651 lived within the incorporated cities and the remaining 67,640 lived in the unincorporated areas. BCAG estimates that the unincorporated area will grow at a rapid rate of 11 percent from 2020 to 2025 in the more immediate aftermath and recovery from the Camp and North Complex Fires. Population growth in the unincorporated county is anticipated to slow slightly to 7 percent between 2025 and 2030 before it drops to 3 percent between 2030 and 2035 and 4 percent from 2035 to 2040. Over the full 25-year period from 2020 to 2045, the unincorporated county population is projected to grow by approximately 23,600 people.

2. Household Projections

To project the number of households in the county through the General Plan horizon, the projected population in the incorporated and unincorporated areas was divided by each area's average number of persons per household. Accuracy of population projections affects housing and employment growth projections. Although an aging population would likely lead to smaller numbers of persons per household over time, there is no way to accurately estimate how the number of persons per household will change over the General Plan horizon. Assuming a constant number of persons per household based on 2020 DOF estimates generates a conservative estimate of the number of households that will reside within the county between 2020 and 2040.

TABLE 2-8 BUTTE COUNTY POPULATION, HOUSING, AND EMPLOYMENT PROJECTIONS, 2020 – 2045

	2020	2025	2030	2035	2040	2045
Population						
Incorporated	142,651	155,016	160,713	168,220	175,554	181,714
Unincorporated	67,640	75,040	80,621	83,046	86,466	91,237
Total County	210,291	230,056	241,333	251,266	262,018	272,950
Households[a]						
Incorporated	54,885	57,711	59,832	62,627	65,357	67,650
Unincorporated	30,435	32,110	34,498	35,535	36,999	39,040
Total County	85,320	89,820	94,329	98,162	102,356	106,690
Housing Units						
Incorporated	54,131	60,602	65,106	69,596	74,035	77,327
Unincorporated	31,991	33,756	35,643	37,669	39,890	41,537
Total County	86,122	94,358	100,749	107,265	113,925	118,864

[a] Household projections are calculated by applying the following 2020 Department of Finance estimates of average household size to the population projections for the incorporated and unincorporated areas within the County. Due to rounding, the average persons per household shown herein, the precise outputs shown in the table do not exactly match the straight calculation of the population divided by 2.69 or 2.34.

Area	Avg. Persons per Household
Incorporated	2.69
Unincorporated	2.34

Sources: BCAG, 2021; California Department of Finance, 2020

Using the persons per household averages for incorporated and unincorporated areas reported by DOF in 2020, population projections in 2030 indicate that there will be approximately 94,329 households countywide, of which, 34,498 households would be located in the unincorporated county. These projections also indicate there would be approximately 102,356 households countywide in 2040, with 36,999 in the unincorporated county.

3. Housing Unit Projections

According to DOF, there were 86,122 housing units in the county in 2020. Of this total, approximately 54,131 were located within the incorporated jurisdictions, and the remaining 31,991 were in the unincorporated county. BCAG estimates that the unincorporated area's housing stock will grow at an increased rate between 2020 and 2025, adding nearly 6,500 new housing units, as fire rebuilding efforts continue. In subsequent five-year intervals from 2025 through 2040, housing unit growth will be steady with approximately 4,500 new housing units every five years and will taper to approximately 3,300 units between 2040 and 2045. At the General Plan horizon year, the unincorporated county will have approximately 39,890 housing units.

a. Reliability of DOF Data

As BCAG bases its population and housing unit projections on DOF data, this analysis includes a brief treatment of DOF data methods and reliability. According to the State Department of Finance's web site, DOF uses the average of the following three methods to determine population and household estimates, and a "Housing Unit" (HU) method to determine the number of housing units.

i. Population and Household Estimates

a) State Driver License Address Change (DLAC) Method. The DLAC method captures interstate and intrastate migration by estimating proportion changes of the State population by county. The Department of Finance uses a modified version of DLAC that factors in documented births, deaths, school enrollment, foreign/domestic migration, medical aid enrollments and group quarters population. Using medical programs runs the risk of overlooking underserved populations and accurately depicting migration changes.

b) Ratio-Correlation Method. Changes in household population as a result of changes in the distribution of births, school enrollments, driver licenses, housing units, and labor force determine the county's share. Estimates of group quarters are factored in.

c) Tax Return Method. This method uses County federal income tax returns and matches information to estimate inter-county migration, in addition to other information for the population aged 65 and over.

ii. Housing Unit Estimates

The Housing Unit (HU) method estimates total and occupied housing units, household size, household population, and group quarters population. This method focuses on new construction, annexations, demolitions, and adjustments from units gained or lost by conversions. The HU changes are supplied by local jurisdictions, the U.S. Census Bureau, and Military Installations. DOF also adjusts the census occupancy rates (occupied units/total units) occasionally, to account for changing vacancy rates such as adding vacancies in areas with rapid housing growth.[7]

iii. Overall Reliability

DOF used these methods to estimate population, households, and housing units, and then compared its 2000 State-level data to U.S. Census data and found that its estimates were within one-half of one percent of the 2000 census count; county estimates differed from the census estimates by an average of 1.9 percent and city estimates differed by an average of 5.6 percent.[8]

4. Employment Projections

BCAG provides countywide employment projections using both DOF and California EDD data. According to BCAG's Post-Camp Fire Regional Growth Forecasts, there were 79,400 jobs in the county in 2020. BCAG projects the number of jobs will increase to 86,470 in 2030 and 93,540 in 2040. As Table 2-9 shows, the county can expect the greatest percentage gains between 2016 and 2026 in the mining, logging, and construction sector, followed by educational services, leisure and hospitality, and other services sectors. However, these sectors do not necessarily represent the largest numbers of new jobs. Since the natural resources, mining, and construction sector had relatively few jobs in 2016 (3,600 jobs), 19.4-percent job growth results in an additional 700 jobs, for a total of 4,300 jobs in 2026. According to EDD data, the county was projected to add the most new jobs (2,700) in the education and health services sector, followed by the leisure and

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[7] California Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011-2020 with 2010 Census Benchmark*, https://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-5/ , accessed February 26, 2021.

[8] California Department of Finance, Table E5, Population and Housing Estimates for Cities, Counties, and the State, 2001-2006, with 2000 Benchmark, Methodology, http://www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E5/E5-06/E-5text2.asp, accessed July 6, 2007.

hospitality sector. However, this data estimate predates the ongoing COVID-19 pandemic, which is anticipated to have myriad impacts to future employment trends.

The data also shows that trade, transportation, and utilities will expand by approximately 600 jobs. It is possible that a substantial portion of these jobs will be attracted to locations in portions of the unincorporated county. Relatively inexpensive land, distance from residential developments, and access to freeways generally attract industrial land uses, and these are attributes that can be found in many unincorporated areas; thus, areas in the unincorporated portion of the county should be able to capture much of this growth if infrastructure is available to support the growth.

TABLE 2-9 BUTTE COUNTY EMPLOYMENT PROJECTIONS BY INDUSTRY, 2016 –2026

Industry[a]	**2016**	**2026**	**Growth Rate**	**Land Use Type**
Mining, Logging, and Construction	3,600	4,300	19.4%	Industrial
Manufacturing	4,300	4,400	2.3%	Industrial
Trade, Transportation, and Utilities	14,200	14,800	4.2%	Industrial
Wholesale Trade	1,900	2,000	5.3%	Industrial
Retail Trade	10,700	11,100	3.7%	Retail
Transportation, Warehousing, and Utilities	1,600	1,700	6.3%	Industrial
Information	1,000	900	-10.0%	Office
Financial Activities	3,600	3,800	5.6%	Office
Finance and Insurance	2,200	2,300	4.5%	Office
Professional and Business Services	5,800	6,300	8.6%	Office
Educational Services (Private), Health Care, and Social Assistance	18,800	21,500	14.4%	Office
Leisure and Hospitality	8,600	9,500	10.5%	Office
Other Services (excludes 814-Private Household Workers)	3,800	4,200	10.5%	Office
Government	16,300	17,000	4.3%	Office
Total Farm	**3,100**	**3,200**	**3.2%**	**Agriculture**
Total Nonfarm	**79,800**	**86,700**	**8.65%**	

[a] Industry detail may not add up to totals due to independent rounding and suppression. The North American Industry Classification System (NAICS) is used by government agencies to classify business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.

Sources: California Employment Development Department 2016-2026 Industry Employment Projections.

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3 Economics

A. Introduction

This section presents an overview of the Butte County economy, information on the existing and projected real estate conditions within the unincorporated portion of the county, as well as the county's existing fiscal conditions. Real estate market trends will likely drive development within the portion of the unincorporated county for the foreseeable future.

Located in the northern Sacramento Valley, away from California's heavily urbanized areas, Butte County has historically been known as an agricultural county. Productive farmlands currently dominate much of the landscape in the flat western parts of the county that are blessed with fertile soils and proximity to the Sacramento River and other waterways that drain out of the mountains to the east. However, the county's economy is undergoing change in response to local, regional, and national trends and this is driving changes in the local landscape.

Much of the county's new development is anticipated to occur within the spheres of influence of Oroville and Chico. Development is attracted to these areas because of proximity to the large and growing base of existing residents, businesses, and amenities located in the cities, as well as the availability of existing infrastructure. Although there have been no formal annexation proposals for these development areas, the County should understand that annexation could occur at some point in the future. In the outlying areas, little development is currently planned. Incremental development of new housing in the small communities that are more distant from the incorporated cities is likely to continue at slow rates, constrained by limited access and infrastructure. In these areas, new commercial development will be small-scale, local-serving retail, services and offices, and these limited developments will only be successful in those locations that offer visibility and access to nearby residents as well as through-traffic on main travel routes.

In addition to understanding the types of development planned for the unincorporated areas, the County should be aware of the fiscal implications of development within the unincorporated portion of the county. The fiscal implications of development can differ significantly based on location. For example, development that occurs within a Tax Rate Area (TRA) that allocates a larger than average share of the basic property tax to the County will generate more revenues than the same development that is built within a TRA that allocates an average or smaller share of the basic property tax to the County. Service costs can also vary based on location. For example, if 3,000 new residential units were built within a rural community in the unincorporated portion of the county and the existing Sheriff service standard is insufficient to meet the demand from new development, then the County would need to adjust service standards for the entire community, not just the new residential units, which could lead to disproportionately high costs of providing Sheriff services to the community. On the other hand, if new residential units were scattered about the rural portion of the county, such development could lead to inefficiencies in service delivery.

On a more global scale, the County also faces fiscal issues related to development that occurs within both the unincorporated and incorporated portions of the county. The County Board of Supervisors has discretion over how to spend a relatively small portion of its budget, while restrictions imposed by outside funding sources dictate how most of the budget is spent. This has important implications for the County as it considers the impacts of growth over the General Plan horizon. A chief concern for the County with regard to its fiscal condition is that while such a large portion of its budget is funded with restricted revenues, these revenues do not tend to increase proportionately with growth in the county's service population. In order to assist the County in choosing optimal land use alternatives, the fiscal portion of this Chapter presents these issues along with the County's existing baseline fiscal conditions.

B. Existing Conditions

1. Agriculture and Timber Production

Agriculture has a major influence on the Butte County landscape and its economy. According to the Butte County 2019 Crop & Livestock Report (hereafter, Crop & Livestock Report), published by the Butte County Agricultural Commissioner, just under 425,670 acres of land were harvested in Butte County in 2019, representing 41 percent of the county's total land area. Although harvested acreage fluctuates from year to year, the total in Butte County has remained relatively stable over the last five years with 420,011 acres harvested in 2015. Field crops made up the majority of 2019 acreage with 310,582 acres, followed by fruit and nut crops with 108,113 acres. Of all crops, rice accounted for the most total acreage, with nearly 96,780 bearing acres, followed by walnuts (56,312 bearing acres) and almonds (39,025 bearing acres).

Data published in the Crop & Livestock Report indicate that in 2019, the value of countywide agricultural and timber production was $688 million, down from $773 million in 2015, despite an increase in total crop acreage. Over the four-year span, some crops increased in value per acre, but significant crop value declines were experienced by fruit and nut crops (down 27 percent per acre) and timber (down 39 percent overall—timber acreage is not available). The value of harvested timber and timber products declined in the 1990s into the early 2000s. Since 2003, the value has leveled off, although there is volatility from one year to the next. There was an increase in the run-up to the 2008/09 recession, a subsequent decline, and then a recovery. Nevertheless, the value of timber sales from 2003 through 2018 averaged $17.3 million a year, 68 percent less than the annual average from 1994 to 2000, when adjusted for inflation. This represents a significant decrease in economic activity in the eastern part of the county since the 1990s, but it had been somewhat consistent since 2003.

2. The Local Economy

A conventional approach to understand an economy's structure is to examine the number of jobs in major economic sectors. Comparing an area's employment distribution to that of the region and state helps identify the local economy's specializations and sectors that are underdeveloped. In the present case, the local economy refers to the unincorporated area of Butte County, the regional economy refers to Butte County as a whole, and the analysis provides comparisons to the statewide economy.

a. Total Employment

The number of jobs in the unincorporated area of Butte County increased from 10,700 jobs in 2003 to 14,000 in 2018 (the most recent year for which data is available). This 31-percent increase in jobs in the local economy exceeds the 22-percent increase countywide and 25-percent increase statewide. The unincorporated area has far fewer jobs per household, 0.44, compared to the county, 0.89, and the state, 1.31. However, the more rapid growth of jobs in the unincorporated area has translated into a larger increase in jobs per household from 2003 to 2018, a 49-percent increase in the unincorporated area compared to a countywide increase of 10 percent and a statewide increase of 12 percent.

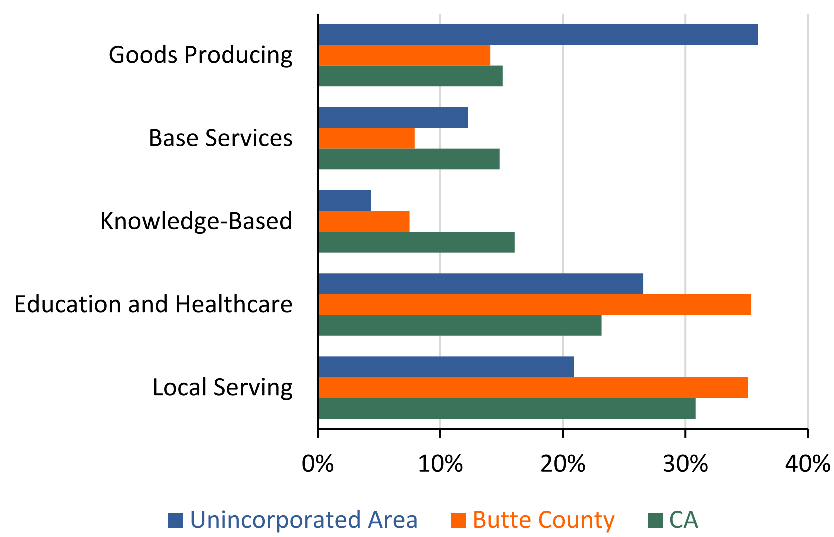
b. Employment by Major Groups of Economic Sectors

Breaking down the changes by major groupings of economic sectors provides a better understanding of the structure of the local economy and how it is growing. The major groups of economic sectors (described in more detail in the following sections) are goods-producing sectors, base-services sectors, knowledge-based sectors, education and health care sectors, and local-serving sectors. Figure 3-1 shows the employment in each major sector as a percentage of the total number of jobs, averaged for 2016 through 2018.

There are two large differences between the local economy and the countywide and statewide economies. First, goods-producing sectors provide more than twice as many jobs in unincorporated Butte County than the sectors provide across the county and the state. Second, local-serving sectors provide a significantly smaller portion of jobs in the unincorporated areas relative to the percentage of jobs provided countywide and statewide.

Regionally, the data show that the Butte County economy is more specialized in economic sectors that provided goods and services to county residents and, perhaps, residents in adjacent jurisdictions. The goods-producing, base services, and knowledge-based sectors provide a smaller percentage of jobs than these sectors account for statewide.

Figure 3-1 Share of Total Employment by Major Groups of Economic Sectors; Unincorporated Butte County, Butte County, and California; Average for 2016 through 2018



Source: PlaceWorks, 2021, using employment data from the US Census Bureau's Longitudinal Employer-Household Dynamics Program.

Table 3-1 provides the rate of growth in employment by major groups of economic sectors from 2003 to 2018. Employment in the unincorporated areas outpaced employment countywide in each group of major economic sectors, except in health and education. Even though growth in these sectors was slightly above the overall rate of job growth in the unincorporated area, it substantially lagged behind these sectors' growth in the regional and state economies. Interestingly, employment in knowledge-based sectors in the unincorporated area increased by 20.1 percent, almost as much as the statewide growth, but decreased countywide.

TABLE 3-1 TOTAL PERCENTAGE CHANGE IN EMPLOYMENT BY MAJOR GROUPS OF ECONOMIC SECTORS; UNINCORPORATED BUTTE COUNTY, BUTTE COUNTY, AND CALIFORNIA; 2003 TO 2018

	Unincorporated Area	Butte County	California
Goods-Producing	38.9%	30.5%	-0.2%
Base Services	36.7%	2.7%	23.9%
Knowledge-Based	20.1%	-6.6%	25.2%
Health and Education	34.2%	52.0%	54.2%
Local Serving	16.4%	9.5%	22.5%
Total Employment	31.3%	22.3%	24.9%

Source: PlaceWorks, 2021, using employment data from the US Census Bureau's Longitudinal Employer-Household Dynamics Program.

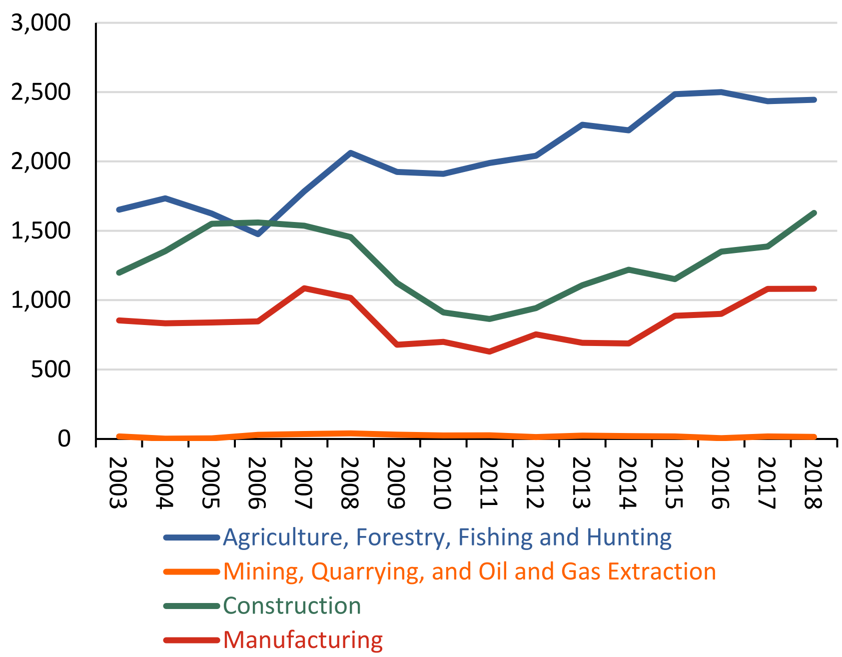
i. Goods-Producing Economic Sectors

Businesses in this group of sectors are involved in harvesting and extracting commodities, transformation of raw materials, and the production of final goods. The group includes the following sectors: agriculture, forestry, fishing and hunting; mining, quarrying, and oil and gas extraction; construction; and manufacturing. Figure 3-2 shows the number of jobs in each of these sectors in the unincorporated area from 2003 to 2018.

Half of this group's employment in the unincorporated area is in the agricultural, forestry, fishing, and hunting economic sector, and 78 percent of the countywide employment in this sector is in the unincorporated area. From 2003 to 2018, employment in this sector in the unincorporated area increased 48 percent, more than three times the rate of growth statewide. Given the declining value of timber production and increasing value of agriculture production discussed previously, the 2018 Camp Fire and 2020 North Complex Fire are expected to have minimal impact on jobs in this sector since 2018. Similarly, the COVID-19 pandemic is not expected to have significantly affected employment in this sector.

Another 30 percent of this group's employment in the unincorporated area is in the construction sector. The unincorporated area accounts for 37 percent of the countywide employment in construction. It is important to note that jobs in the construction sector are accounted for at the location of the businesses employing construction workers and not at the site of individual construction projects. In the unincorporated area, the construction sector lost many jobs with the 2008/09 recession, but by 2018, the number of jobs was higher than ever. The fires may have had a short-term impact on construction jobs, but, assuming that funding is available, the recovery can be expected to support an increasing number of jobs in this sector.

Figure 3-2 Number of Jobs in Each Goods-Producing Sector; Unincorporated Butte County; 2003 to 2018



Source: PlaceWorks, 2021, using employment data from the US Census Bureau's Longitudinal Employer-Household Dynamics Program.

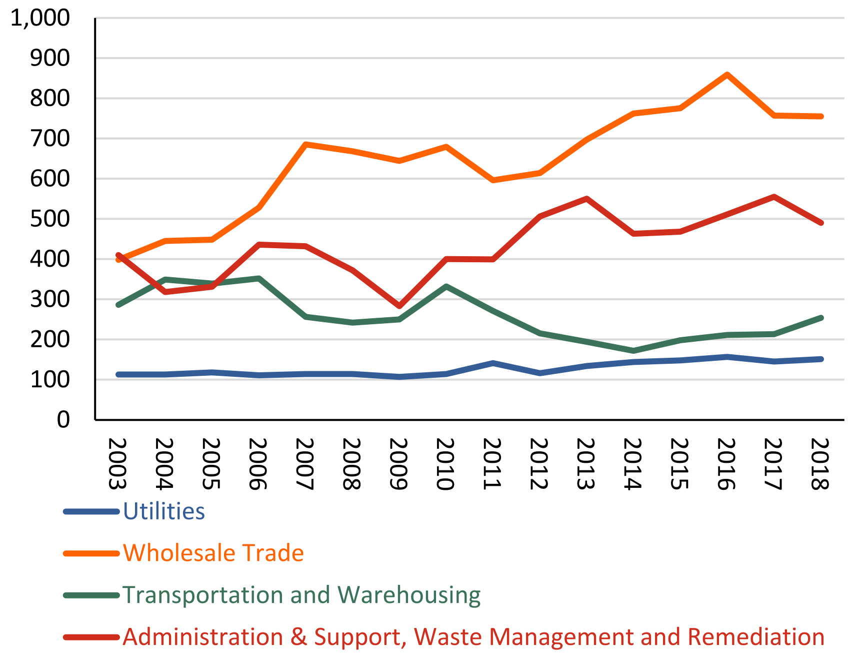
ii. Base Services Economic Sectors

Businesses in this group of sectors provide necessary services to goods-producing businesses and to other types of businesses and households. The group includes utilities; wholesale trade; transportation and warehousing; administration and support; and waste management and remediation. Figure 3-3 shows the employment in each of the base services sectors in the unincorporated area from 2003 to 2018.

The wholesale trade sector provides 47 percent of the jobs in the group of sectors, and 39 percent of the countywide jobs in this sector are in the unincorporated area. From 2003 to 2018, the number of jobs in this sector in the unincorporated area increased 90 percent, five times the growth rate countywide and two times the rate statewide. Because this sector distributes goods to retail stores, it can be expected that fire-related demand reduction (see the discussion under retail trade below) may have had a partial impact since 2018. More concerning is the pandemic-related reduction in sales at retail stores, which can be expected to put downward pressure on employment in this sector starting in 2020. In contrast, transportation and warehousing, which includes distribution to wholesalers and fulfillment centers, is expected to weather the pandemic economic disruption fairly well. However, this sector accounts for about half the share of jobs in this group in the unincorporated area and countywide relative to statewide employment. From 2003 to 2018, the number of jobs in this sector declined in the unincorporated area and countywide, while increasing 45 percent statewide.

The administration and support, waste management, and remediation sector accounts for another 31 percent of the jobs in this group of sectors in the unincorporated area. However, this sector accounts for substantially more jobs countywide and statewide. Employment growth in this sector in the unincorporated area and countywide, about 20 percent from 2003 to 2018, lagged statewide growth, 26 percent. It is hard to draw specific conclusions about this sector because more than a third of the jobs countywide were at employment services businesses, which provide temporary staffing across many different sectors.

Figure 3-3 Number of Jobs in Each Base Services Sector; Unincorporated Butte County; 2003 to 2018



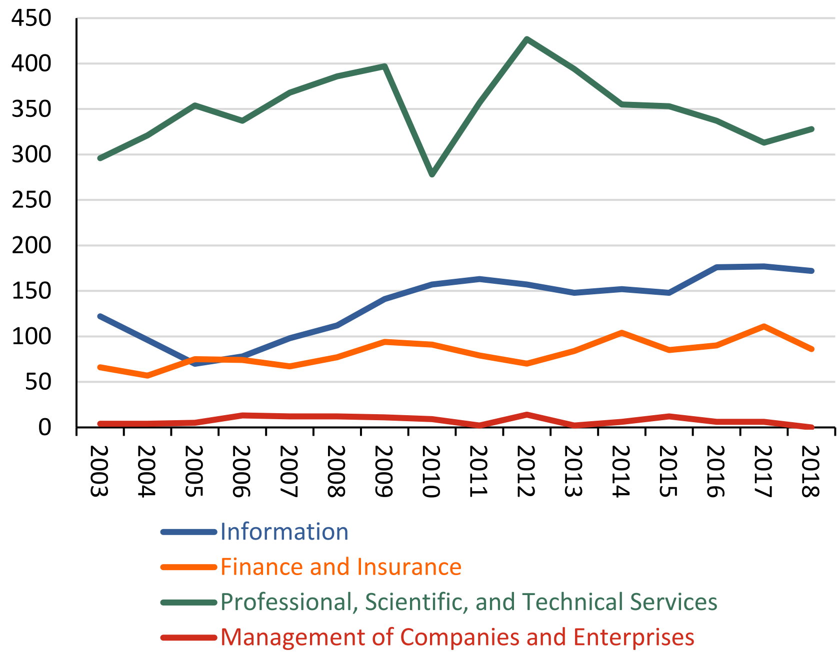
Source: PlaceWorks, 2021, using employment data from the US Census Bureau's Longitudinal Employer-Household Dynamics Program.

iii. Knowledge-Based Economic Sectors

Businesses in this group of sectors rely extensively on educated and skilled workers and provide services to businesses and individuals. The group includes information; finance and insurance; professional, scientific, and technical services; and management of companies and enterprises. Figure 3-4 shows the employment in each of the knowledge-based sectors in the unincorporated area from 2003 to 2018.

As discussed previously, this group of sectors is very small in the local and regional economy, accounting for less than 5 percent of jobs in the unincorporated area and just over 7 percent of countywide jobs. The largest economic sector in this group—professional, scientific, and technical services—provides just over 2 percent of the total jobs in the unincorporated area and 3 percent of countywide jobs. Because this group of sectors accounts for about half the percent of jobs countywide as it accounts for statewide, these sectors may be an important focus for countywide economic development. Nevertheless, growth in these sectors is unlikely to have a substantial effect on land use and development in the unincorporated area of the county.

Figure 3-4 Number of Jobs in Each Knowledge-Based Sector; Unincorporated Butte County; 2003 to 2018



Source: PlaceWorks, 2021, using employment data from the US Census Bureau's Longitudinal Employer-Household Dynamics Program.

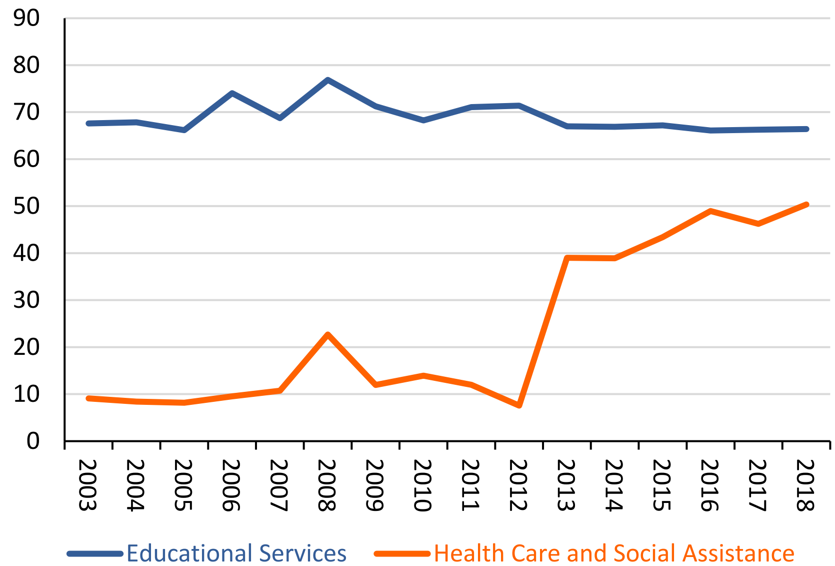
iv. Education and Healthcare Economic Sectors

Businesses in this group of sectors provide health care and educational services to individuals. These businesses are separated from local-serving sectors because the payment/funding for services and the decisions on where to locate are less tied to residents. The group includes educational services and health care and social assistance. Because these sectors (as well as the local-serving sectors in the next section) typically provide services to local residents, the analysis measures the number of jobs per 1,000 households, rather than the number of jobs as a percentage of total jobs. Figure 3-5 shows the employment in the education and health care sectors per 1,000 households in the unincorporated area from 2003 to 2018.

The unincorporated area has 66 jobs in educational services per 1,000 households, lower than the countywide rate, 107 jobs, and the statewide rate 113 jobs. The unincorporated area accounts for 22 percent of countywide education jobs. While it might appear that the unincorporated area is underserved, schools in incorporated jurisdictions often serve residents in adjacent unincorporated areas. The fact that the countywide number of jobs in education per household is similar to the statewide rate suggests that overall Butte County is adequately served. From 2003 to 2018, the number of education jobs in the unincorporated area of the county per 1,000 households remained rather level at an average of 69 jobs and ranging from a low of 66 in 2016 to a high of 77 in 2006. However, the number of jobs per 1,000 residents increased 17 percent countywide and 7 percent statewide from 2003 to 2018. With the displacement of households and other disruptions caused by the two fires, it can be expected that the number of education jobs in the unincorporated area may have been impacted since 2018, and the number of education jobs countywide may have decreased with the decline in the total number of households. In addition, it can be expected that some school districts may have constrained hiring in response to budget pressures resulting from the pandemic. However, it is not expected that the pandemic will have lingering impacts on the number of education jobs.

The unincorporated has 49 jobs in the healthcare and social assistance sector per 1,000 residents, substantially below the countywide rate, 207 jobs, and the statewide rate, 187 jobs. The lower rate of jobs in this sector in the unincorporated area reflects hospitals and associated services being located in incorporated jurisdictions. The higher rate of jobs in this sector countywide relative to the state suggests that healthcare and social assistance service providers are providing services to residents in adjacent counties. The number of healthcare and social assistance jobs in the unincorporated area per 1,000 residents increased 454 percent from 2003 to 2018. This is much higher than growth countywide, 49 percent, and statewide, 68 percent. The number of jobs increased dramatically in all three places in 2013 as healthcare coverage under the federal Affordable Care Act went into effect. With the aging of the baby boom generation, it is expected that healthcare spending will continue to grow, and the number of jobs in this sector will continue to increase.

Figure 3-5 Number of Jobs in Education and Healthcare Sectors per 1,000 households; Unincorporated Butte County; 2003 to 2018



Source: PlaceWorks, 2021, using employment data from the US Census Bureau's Longitudinal Employer-Household Dynamics Program, and number of households estimates from the CA Department of Finance.

v. Local-Serving Economic Sectors

Businesses in this group tend to provide services directly to individual customers. The group includes the following sectors: retail trade; real estate and rental and leasing; arts, entertainment, and recreation; accommodation and food services; other services; and public administration. For each sector in this group,

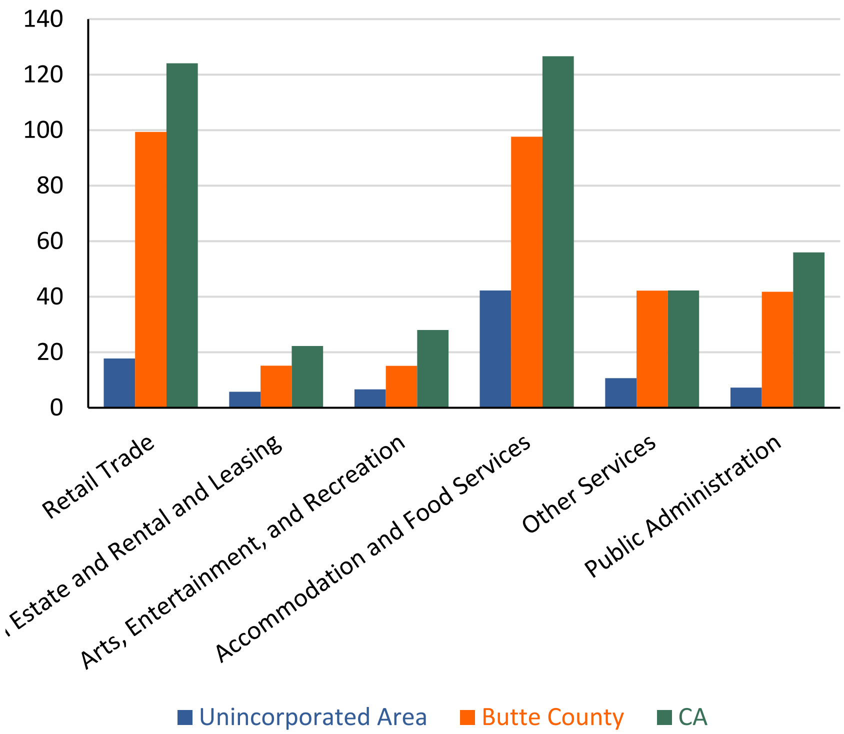
shows the number of jobs per 1,000 households for the unincorporated area, Butte County, and the state.

For each of the sectors, the number of jobs per 1,000 households is somewhat less for the county relative to the state. However, this difference is not unexpected for a predominantly rural county that is not part of one of the major metropolitan areas.

Figure 3-6 show very large discrepancies between the unincorporated area and the county as a whole, especially for retail trade, accommodation and food services, and other services. While some difference is to be expected—unincorporated areas are less dense and less populous, and they lack water and sewer infrastructure in most cases—the magnitude of the differences suggests that there is potential to support additional local-serving businesses. There is no magic number for how many businesses an unincorporated area can serve. It depends on the number of households and level of income as well as the distance to the nearest commercial district in an incorporated area.

With the displacement of households and other disruptions resulting from the fires, it can be expected that there is less consumer spending in the affected areas and the number of jobs in local-serving sectors will have declined since 2018. Economic recovery in the affected areas will depend on how long it takes for displaced households to return to permanent housing and the number of households that are able to and choose to return. Based on national and statewide data, it can also be expected that the economic impacts of the pandemic will have reduced the number of jobs in local-serving sectors in 2020. More importantly, the long-term shift from spending at stores to online purchases of goods has accelerated with the pandemic. There is a general expectation that retail stores will not return to pre-pandemic levels of economic activity. Similarly, with accommodations, there is a general expectation that there will be permanent reductions in business travel and that the lodging industry will not fully recover to pre-pandemic levels. For restaurants, the concern is that many restaurants have closed permanently and that returning to pre-pandemic levels of economic activity will take several years.

Figure 3-6 Number of Jobs in Local-Serving Economic Sectors per 1,000 Households; Unincorporated Butte County, Butte County, and California; Average for 2016 to 2018



Source: PlaceWorks, 2021, using employment data from the US Census Bureau's Longitudinal Employer-Household Dynamics Program, and number of households estimates from the CA Department of Finance.

c. Land Use and Development Implications of the Local Economy

Strength in the agricultural, forestry, hunting, and fishing sector should continue to support agricultural land uses in unincorporated areas. However, continued declines in the value of timber harvest suggest potential issues in the eastern parts of the county.

Continued strength in other goods-producing sectors, including manufacturing and construction, should continue to support industrial land use and development in unincorporated areas. However, declines in warehousing and transportation coupled with potential pandemic impacts on wholesaling could offset some of the industrial strength expected from goods-producing sectors. The majority of industrial activity in the unincorporated portion of the county is clustered near Highway 99 and Highway 70, as access to transportation nodes is required for this type of use. Industrial space in the more remote regions of the county is sparse, agriculture-based and tends to be situated near existing railroad tracks.

There is little expectation that growth in knowledge-based sectors will support significant office development in the unincorporated area of the county. However, continued growth in healthcare can be expected to support new medical office development. Capitalizing on this potential will require land area suitable for commercial development in proximity to areas of concentrated population in unincorporated areas.

The data suggests that there may be latent demand for additional commercial development for local-serving businesses in unincorporated areas. However, the impact of the fires and the pandemic may suppress this market demand. The most likely opportunities for new commercial development in unincorporated areas will be those areas where new residential development can be expected. There is very little information is available regarding market conditions in areas located away from the incorporated areas in Butte County. Areas like Forest Ranch and Stirling City have only basic neighborhood-serving retail establishments in the form of a small market or general store, and currently do not have any commercial properties for sale or lease. More populated unincorporated areas like Durham have the same category of neighborhood-serving retail and also include the minimum office space required for basic local-serving businesses, such as health-related services and real estate offices. Lack of water and sewer infrastructure will likely keep population density low and hinder the viability of commercial uses in these outlying areas.

3. Market Trends

Real estate development activity in Butte County is concentrated within the incorporated cities. Residential development in the unincorporated portion of the county is primarily focused on the north and south periphery of Chico, southern Oroville, and Thermalito. When the current General Plan was being prepared, the regional housing market, like the markets across the state and nation, was in a tremendous upcycle, which began declining in 2006 before crashing with the 2008/09 recession. The 2007 Setting and Trends Report noted that the then currently proposed or under development residential projects would add more than 3,000 new housing units to southern Oroville, 500 in Thermalito and 200 in north Chico. Although the housing market has recovered from the 2008/09 recession, it has yet to produce the number of housing units being constructed prior to the recession. In the past five years, the Butte County Planning Commission has only had four proposed development projects with more than ten lots come before it. This is not to say that the Planning Commission has not been busy, only that housing development is not as vigorous as it had been. Nevertheless, recovery from the two fires may drive a substantial amount of housing construction, but most of this will be in areas already planned, zoned, and subdivided for housing.

Outside of rebuilding from the fires in the eastern portions of the county, outlying areas of the unincorporated portion of the county are currently experiencing little residential growth, with no substantial developments planned or proposed. In time, it is possible that these areas will demand additional retail services beyond a basic market, such as a restaurant or coffee shop. Future office development will likely focus on basic, community-oriented services, such as medical services in a community that has a higher-than-average number of seniors, or real estate services in a community that is experiencing growth.

Industrial growth in the county is almost entirely focused near the Highway 99 corridor. Industrial space in the unincorporated region is not common outside of agricultural related industrial uses like the rice storage and processing facilities in Richvale.

4. Property Values and Market Conditions

Data for residential property values is readily available because there are many sales each year that can be tracked. However, commercial and industrial businesses often lease the property where they operate, and the ones that own their facilities tend to own them for a long time. Thus, there is limited data available to provide an assessment of commercial and industrial property values in the unincorporated areas of the county.

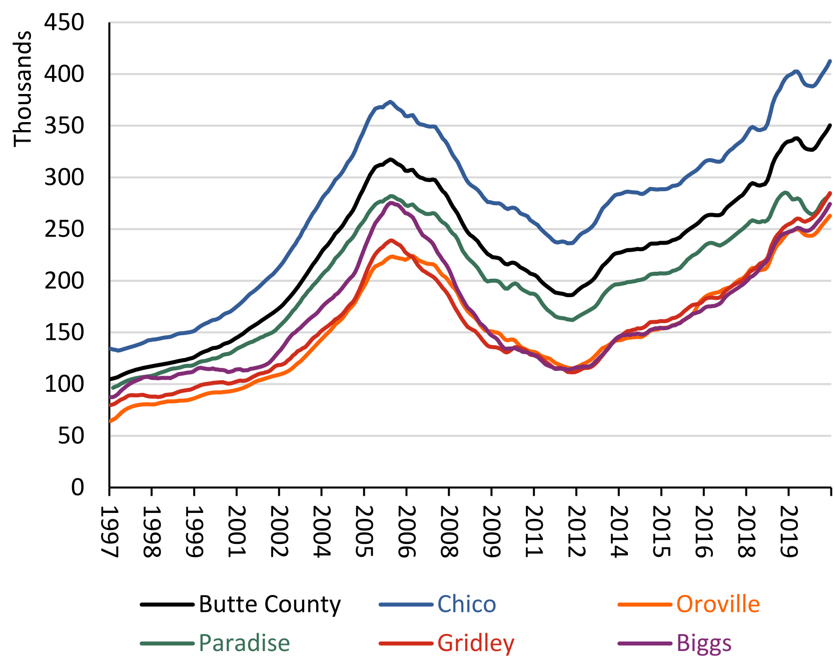
a. Residential

Figure 3-7 shows the value of a typical single-family house countywide and in each of the incorporated jurisdictions from 1997 to 2021. For all six areas represented in the chart, the escalation in home values prior to the 2008/09 recession and the subsequent decline starting in 2006 are clearly evident. In all six of the areas, home values began to increase again in 2012. The data are derived from home sales and do not reflect the value of homes destroyed in the two fires. There is no drop in the estimated value of houses in 2018, although values declined in Paradise from August through October 2019. There is, however, a decline in home values across all six areas for the first part of 2020. This decline is an impact of the COVID-19 pandemic.

Home values began to increase again in April 2020 (Biggs and Gridley), June (Oroville), and July (countywide, Chico, and Paradise).

Over the past five years, home values have increased substantially: 34 percent in Paradise, 40 percent in Chico, 45 percent countywide, 65 percent in Oroville, 71 percent in Gridley, and 73 percent in Biggs. Property tax revenues have not increased commensurately because Proposition 13 limits the increase in taxable assessed value to no more than 2 percent per year.

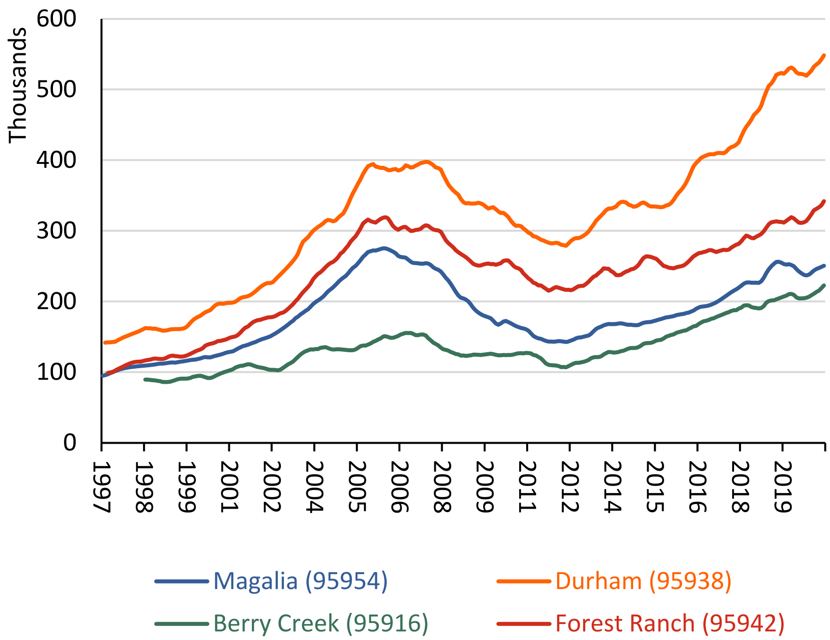
Figure 3-7 Typical Single-Family House Value; Butte County and Incorporated Jurisdictions; Monthly, January 1997 to January 2021



Source: PlaceWorks, 2021, using data from the Zillow Home Value Index; data reflect the value of the typical single-family house in the 35 to 65 percentile price range and are smoothed and seasonally adjusted.

Figure 3-8 shows the same typical home value data for the zip code areas for four unincorporated communities: Magalia, Durham, Berry Creek, and Forest Ranch. These home values show the same upward and downward trend of escalation and steep decline associated with the 2008/09 recession. Magalia has the same three-month steep decline in the late summer and fall of 2019. Finally, these communities have also experienced a substantial appreciation in property values over the last five years: 39 percent in Forest Ranch, 40 percent in Magalia, 45 percent in Berry Creek, and 59 percent in Durham.

Figure 3-8 Typical Single-Family Home Value; Zip Code Area for Select Unincorporated Communities; Monthly, January 1997 to January 2021



Source: PlaceWorks, 2021, using data from the Zillow Home Value Index; data reflect the value of the typical single-family house in the 35 to 65 percentile price range and are smoothed and seasonally adjusted.

Taken together, the increase in home values in all these areas and countywide suggests that the housing market is strong. However, it also suggests that Butte County faces the same issue that plagues the state: the market is not producing enough housing and has not been since the 2008/09 recession. This is true for the many households displaced by the two fires that still see no permanent housing solution on the horizon. It is also true for young people wanting to move out on their own, households that are doubled up just to afford housing, and those who would migrate to Butte County for the strong job growth but for the lack of a place to live.

b. Retail

With stay-at-home orders to combat the COVID-19 pandemic and a greatly reduced appetite for in-person shopping even when the orders have bene lifted, this is a poor time to assess the market conditions for retail. Nevertheless, posted asking lease rates for retail space in Chico and Oroville are no higher and in many cases are lower than reported in the 2007 Setting and Trends Report. Furthermore, with asking lease rates mostly under $18 per square foot, lease revenue is very likely insufficient to support new retail development and very likely insufficient to support sales of retail property without a very motivated seller.

It is still too early to know exactly what the near-term future holds for the retail market. Prior to the pandemic, online sales had been growing at the expenses of bricks and mortar stores, which have never fully recovered from the 2008/09 recession based on inflation-adjusted per household spending. During the pandemic, online sales have skyrocketed. The general consensus is that spending at retail stores will never fully recover. This means the market will likely support fewer stores going forward. However, retail growth may happen in areas with significant residential growth.

Retail vacancies may become problematic in the near term, although this may be more of an issue for the incorporated jurisdictions than it will be in the unincorporated area of the county. Excess vacant space typically puts downward pressure on market rate rents, which, in turn, hinder property owners from reinvesting in their properties and inhibit new development. As the economy emerges from the pandemic and retail market conditions become clearer, it may become necessary to repurpose some commercial properties in order to minimize excess vacancies.

In contrast to retail stores, spending at restaurants, on an inflation-adjusted per household basis, had been steadily growing for many years. The pandemic has forced temporary and permanent closure of many restaurants. It may take time for the food service industry to recovery, but the expectation is that eventually restaurant growth will resume and the long-term trend of expansion will continue.

c. Office

As with retail, stay-at-home orders have affected office-based businesses, but the impacts have been different. The internet does not necessarily replace local office-based businesses, although improvements in technology allow some businesses to offer their services without in-person meetings. Even healthcare has seen an uptick in telemedicine.

The bigger effect on office-based businesses has been improvements in technology that facilitate remote work. Many office workers may not return to full-time work at the office. Some may work almost exclusively at home, but many may work at home some days and at the office on other days. The general consensus is that office-based businesses will seek to reduce their office footprint. However, most office leases are long term, so the impact of this shift may take several years to manifest itself in vacant office space. Nonetheless, this shift can be expected to put downward pressure on office lease rates and, consequently, reduce the value of existing office property and hinder new office development.

The same technology that facilitated working from home has also compensated for travel restrictions. Business travel, which is the most profitable segment in the travel industry, is not expected to return to pre-pandemic levels. This will weaken the hospitality industry, namely lodging establishments and some restaurants.

Posted leasing rates for office space in Chico and Oroville are somewhat higher than the rates identified in the 2007 Settings and Trend Report. This suggests that the office market has strengthened since then and that the pandemic and resulting technology improvements have not yet impacted the office market. Nevertheless, the county should expect weak demand for office space and office development going forward.

d. Industrial

Unlike the office and retail market. The industrial market has generally been unscathed by the pandemic, at least from an economic perspective. Posted leasing rates for industrial properties are generally in line with the leasing rates identified during the preparation of the current general plan. However, the growth in goods-producing and base services sectors suggest continued support for industrial building space and new industrial development as vacant industrial space becomes sparce.

C. Projected Growth and Development

1. Residential Development

Growth in population and households, in addition to the loss of more than 14,000 housing structures in the Camp Fire (2018) and North Complex Fire (2020), drives demand for residential development. Table 3-2 provides projections for population, households, and housing from the Butte County Association of Governments

(BCAG).[1] BCAG projects that the population residing in the unincorporated area of Butte County will increase 32.3 percent, from 67,640 in 2020 to 86,466 in 2040. This is following a population decline of 16.6 percent from 2018 (81,088 residents) to 2020, as a result of the 2018 Camp Fire. With the BCAG-projected decrease in the average household size from 2.39 to 2.28 over this period, the number of households would increase by 23.8 percent. To accommodate this household increase, BCAG projects that 7,899 new housing units would need to be constructed between 2020 and 2040. BCAG also projects that almost 3,000 housing units will be constructed by 2020. It is not specified in the BCAG projections how many of these new housing units are replacements for housing destroyed in the fires and how many reflect new growth in other parts of the unincorporated area of the county.

TABLE 3-2 PROJECTED POPULATION, NUMBER OF HOUSEHOLDS, AND NUMBER OF HOUSING UNITS; BUTTE COUNTY, 2018 TO 2040

	Incorporated Jurisdictions	Unincorporated Area	Countywide Total
Population			
2018	145,286	81,088	226,374
2020	142,651	67,640	210,291
2025	155,016	75,040	230,056
2030	160,713	80,621	241,334
2035	168,220	83,046	251,266
2040	175,554	86,466	262,020
Households			
2018	63,381	35,880	99,261
2020	54,186	32,057	86,243
2025	59,692	34,902	94,594
2030	64,055	36,982	101,037
2035	69,869	37,577	107,446
2040	75,240	38,949	114,189
Housing Units			
2018	63,443	35,910	99,353
2020	54,131	31,991	86,122
2025	60,602	33,756	94,358

[1] While the Draft Post Camp Fire Regional Growth Forecast data does account for the destruction of housing in the Camp Fire; the forecasts do not account for housing destroyed in the North Complex Fire.

	Incorporated Jurisdictions	Unincorporated Area	Countywide Total
2030	65,106	35,643	100,749
2035	69,596	37,669	107,265
2040	74,035	39,890	113,925

Source: PlaceWorks, 2021 using population, average household size, and number of housing units projections from the Butte County Association of Governments' *Draft Post Camp Fire Regional Growth Forecast, 2021*.

2. Nonresidential Development

Growth in employment is the primary driver of demand for new nonresidential development. Table 3-3 estimates the change in employment in each economic sector in the unincorporated area of Butte County based on the BCAG-projected employment. These employment projects are used in the following sections to estimate the nonresidential development potential created by the projected employment growth.

TABLE 3-3 PROJECTED INCREASE IN EMPLOYMENT BY ECONOMIC SECTOR; BUTTE COUNTY UNINCORPORATED AREA; 2020 TO 2040

	2020–25	2025–30	2030–35	2035–40
Farming, Mining, Logging, and Construction	28	21	165	119
Manufacturing	7	5	41	29
Wholesale Trade	7	6	45	32
Retail Trade	7	5	42	31
Transportation, Warehousing, and Utilities	10	8	60	43
Information	2	1	11	8
Finance and Insurance	0	0	0	0
Real Estate and Rental and Leasing	4	3	22	16
Professional and Business Services	9	7	53	38
Education, Health Care, and Social Assistance	25	19	148	107
Leisure and Hospitality	9	7	56	40
Other Services	65	50	388	279
Government	-6	-4	-34	-24

Source: PlaceWorks, 2021, using countywide employment projections from the Butte County Association of Governments' *Provisional Long-Term Regional Growth Forecasts* 2018–2040, 2019, employment projects by economic sector data from the CA Employment Development Department, and unincorporated area percentage share of countywide employment by economic sector data from the US Census Bureau's *Longitudinal Employer-Household Dynamics Program*.

a. Retail/Commercial

Retail development would accommodate employment growth in the retail trade, finance and insurance, real estate, leisure and hospitality, and other service sectors. From 2020 to 2040, these sectors are projected to add up to 1,025 jobs in the unincorporated area. However, 53 percent of these jobs will be in the accommodation and food services sectors. Development for hotels and restaurants will primarily favor locations with water and sewer service. Thus, many of these jobs may well end up in incorporated jurisdictions. Assuming 40 of the 53 percent of jobs do not occur in the unincorporated area, the total potential employment growth for retail/commercial development is 615. Using an industry standard of 350 square feet per employee (for a mix of retail and commercial services businesses), there is potential demand for up to 215,000 square feet of retail/commercial development over 20 years. However, this demand may be offset somewhat by potential vacancies resulting from the pandemic and the shift to online retail.

b. Office

Office development would accommodate employment growth in information, professional and business services, and education and healthcare. Although education is included here, the projections is for very little growth in education jobs. From 2020 to 2040, employment in these sectors is projected to add almost 430 jobs in the unincorporated area. Assuming an industry standard of 300 square feet per employee (a mix of traditional office space and medical offices), this growth could create demand for up to 128,000 square feet of new office development. As with the retail demand, though, this new development may be offset by rising office vacancies over the next several years.

c. Industrial

Industrial development would accommodate employment growth in the manufacturing, wholesale trade, and transportation, warehousing, and utilities sectors, plus 40 percent of the jobs in the farming, mining, logging, and construction sector (to account for construction jobs only). From 2020 to 2040, these sectors are project to add 160 jobs. The average square feet per employee varies widely between construction and warehousing. The analysis assumes a blended rate of 850 square feet per employee. Thus, growth in these sectors would support the development of up to 136,000 square feet of new industrial facilities.

D. Baseline Fiscal Conditions

The COVID-19 pandemic has upended local government finance across the country, especially in counties, which are responsible for public health and have custodial responsibilities for jail populations. For Butte County, there are the added responsibilities of recovery and rebuilding in the aftermath of the Camp and North Complex fires.

This section of the report provides some basic information about the sources of Butte County's General Fund dollars and how the County spends them. In addition, this section includes a brief discussion of other funding mechanisms (e.g. building permit fees, etc.) that would be affected by growth in the unincorporated portion of the county.

1. Budget Overview

According to the Fiscal Year 2020–21 Adopted Budget, the County's budget totals $645,300,000. Counties implement many State and federal programs at the local level, and much of the County's budget is State and federal funding for these programs. As noted in the budget document, only about 20 percent of the total budget is under the discretion of the County.

Counties operate at two levels, and this distinction further complicates budgeting. Butte County provides many services to residents countywide, regardless if they live in an incorporated jurisdiction or in an unincorporated area of the County. Examples include public health and the District Attorney. A small portion of the property tax paid by property owners in incorporated jurisdictions help fund regional services. The County also provides local services, similar to some of the services cities provide, to residents in the unincorporated area. A slightly larger portion of the property tax paid by property owners in unincorporated areas help fund both regional services and local services.

This has important implications for the County as it considers the impacts of growth over the General Plan horizon. A chief concern for the County with regard to its fiscal condition is that while such a large portion of its budget is funded with restricted revenues, these revenues do not tend to increase proportionately with growth in the County's service population. With general purpose revenue funding such a small portion of the County's budget, the Board of Supervisors has limited ability to steer its budget to compensate for shortfalls that may arise from the disconnect between rising service costs and restricted revenue sources, forcing difficult decisions in order to balance the budget while trying to maintain service levels to the greatest extent possible.

2. Expenditures

Table 3-4 summarizes the budgeted expenditures for regional services (those provided countywide, in both cities and unincorporated areas). The first column of figures shows the total expenditures, and the second column shows the net County cost for each activity. The final column shows the net per capita costs. Overall, net county costs for regional services total to $253 per capita.[2]

TABLE 3-4 BUDGETED EXPENDITURES FOR REGIONAL SERVICES; BUTTE COUNTY; FISCAL YEAR 2020–21

Budget Function and Activity	Total Expenditures	Net County Cost	Net Cost per Capita
General Government			
Legislative and Administration	8,034,104	5,596,871	27
Finance	22,627,861	-81,504,825	-388
Counsel	1,046,505	403,901	2
Personnel	2,458,425	712,386	3
Elections	3,177,122	1,132,775	5
Communication	5,499,822	639,737	3
Property Management	3,795,211	1,814,847	9
Plant Acquisition	21,329,806	1,489,074	7
Promotion	551,500	332,924	2
Other	3,287,711	3,251,813	15
Public Protection			
Judicial	32,906,216	17,477,405	83
Police Protection	31,229,244	24,283,860	115
Detention/Correction	66,261,644	34,725,207	165
Fire	0	0	
Flood Soil Water Conservation	8,244	8,154	0

[2] CA Department of Finance population estimates for 2021 were not available at the time this report was prepared. The per capita cost are based on the estimated countywide population, 210,291 residents, as of January 1, 2020.

Budget Function and Activity	Total Expenditures	Net County Cost	Net Cost per Capita
Protection Inspection	0	0	
Other Protection	11,691,498	3,656,317	17
Public Ways and Facilities			
Public Ways	0	0	
Transportation Systems	0	0	
Health and Sanitation			
Health	113,073,860	1,884,437	9
Public Assistance			
Administration	112,537,047	12,704,200	60
Aid Programs	76,422,502	19,945,712	95
Veterans Services	491,906	50,365	0
Other Assistance	469,575	18,580	0
Education			
Library Services	4,212,793	3,695,049	18
Ag Education	300,989	300,989	1
Recreation			
Veterans Memorial Buildings	66,047	31,806	0
Debt Services			
Retire Long-Term Debt	5,341,068	589,368	3
Total	**526,820,700**	**53,240,953**	**253**

Source: PlaceWorks, 2021, using data from the Butte County Fiscal Year 2020–21 Adopted Budget and population estimate from the CA Department of Finance.

Table 3-5 summarizes the budgeted expenditures for local services (those provided only in the unincorporated area of the County). The first column of figures shows the total expenditures, and the second column shows the net County cost for each activity. The final column shows the net per capita costs. Overall, net county costs for local services total to $168 per capita.[3]

[3] CA Department of Finance population estimates for 2021 were not available at the time this report was prepared. The per capita cost are based on the estimated population residing in unincorporated areas, 67,640 residents, as of January 1, 2020.

TABLE 3-5 BUDGETED EXPENDITURES FOR LOCAL SERVICES; BUTTE COUNTY; FISCAL YEAR 2020–21

Budget Function and Activity	Total Expenditures	Net County Cost	Net Cost per Capita
General Government			
Legislative and Administration	0	0	
Finance	4,347,177	-15,658,393	-231
Counsel	0	0	
Personnel	0	0	
Elections	0	0	
Communication	0	0	
Property Management	0	0	
Plant Acquisition	2,458,530	216,402	3
Promotion	0	0	
Other	0	0	
Public Protection			
Judicial	0	0	
Police Protection	0	0	
Detention/Correction	0	0	
Fire	23,690,172	20,387,959	301
Flood Soil Water Conservation	0	0	
Protection Inspection	14,806,644	4,195,790	62
Other Protection	0	0	
Public Ways and Facilities			
Public Ways	51,546,285	2,277,168	34
Transportation Systems	1,380,035	0	
Health and Sanitation			
Health	0	0	
Public Assistance			
Administration	0	0	
Aid Programs	0	0	
Veterans Services	0	0	

Budget Function and Activity	Total Expenditures	Net County Cost	Net Cost per Capita
Other Assistance	5,472,099	-78,102	-1
Education			
Library Services	0	0	
Ag Education	0	0	
Recreation			
Veterans Memorial Buildings	0	0	
Debt Services			
Retire Long-Term Debt	0	0	
Total	**103,700,942**	**11,340,824**	**168**

Source: PlaceWorks, 2021, using data from the Butte County Fiscal Year 2020–21 Adopted Budget and population estimate from the CA Department of Finance.

3. Allocation of Expenditures Between Cities and Unincorporated Areas

These per capita costs help provide an understand of how the County's expenditures are allocated. The County's total net expenditures in the incorporated area are $253 per resident. The total net expenditures in unincorporated areas are $421 ($253 for regional services and $168 for local services). The results are lower than the results when the 2007 Settings and Trends Report was prepared. At that time, net per capita expenditures for residents in incorporated areas was $410 and $806 for residents in unincorporated areas. The difference may be due to the additional State and federal funding that the County is receiving for recovery from the fires and for the pandemic.

If the amount of expenditures per capita is multiplied by the number of residents (i.e., $253 for the 210,291 residents in incorporated areas and $421 for the 67,640 residents in unincorporated areas), the data suggests that 56 percent of the net County costs are allocated to incorporated areas and 54 percent to unincorporated areas. This is the same ratio that resulted from the 2007 analysis. As the previous report noted, while the County has little control over the type and rate of development within the cities, the populations residing within the cities drive a substantial piece of the County's overall expenditure requirements.

4. General Purpose Revenue Sources

According to the 2020–21 adopted budget, property taxes (including the in-lieu VLF35) account for 35 percent of the general fund, followed by intergovernmental revenues at 22 percent, transfers-in from other funds at 16 percent, and charges for services at 11 percent. Following are discussions of several of important sources of unrestricted revenue.

a. Property Taxes

For new development within the unincorporated area, the actual portion of the new property taxes generated by the development that accrues to the County's General Fund will depend on the specific Tax Rate Area (TRA) in which the development is located. The County is divided into numerous TRAs that account for the unique combination of governmental entities that provide services within each respective TRA and receive a share of the property taxes. According to data furnished by the Butte County Auditor-Controller's office, the Butte County General Fund's share of the property tax increment in the unincorporated area TRA's ranges from 7.89 percent to 20.61 percent, with an average allocation rate of 17.45 percent. This means that certain locations within the county will be more attractive for the county for new development from a fiscal perspective than other locations.

For example, if developers build a new home with an assessed value of $400,000 in a location where the county's share of the basic property tax is 17.45 percent, the County will receive approximately $698 per year in property tax revenues. However, if the same home is built in an area that yields a lower (7.89 percent) share of the basic property tax for the County, the County will only receive $316 in property tax revenues. Likewise, if the house is located in a tax rate area with an above average share (20.61 percent) of the basic property tax, the County will receive approximately $824 in annual property tax revenues. Thus, the location of future developments in relation to County TRAs is an important consideration.

b. Property Taxes in Lieu of Vehicle License Fees

Because the State has ceased providing Counties with a pass-through of motor vehicle license fees (VLF), which were based on the number of residents, and replaced that subvention with property tax in-lieu of VLF, which is based on the change in total assessed value within the county, the assessed value of future development will become increasingly important to the fiscal health of the county. For example, according to the County's 2007-2008 budget, this helped to contribute to an increase in the portion of the property taxes that the County retains from approximately 13 percent, to approximately 25 percent.

c. Sales and Use Taxes

The current sales tax rate in Butte County is 7.25 percent with 1 percent of the total taxable sales going to the County's General Fund. The County will receive General Fund revenues from any taxable retail sales that occurs as a result of the retail development under the General Plan.

d. Transient Occupancy Taxes

The County collects tax revenues from lodging establishments within the unincorporated areas of the county. Any time that a person rents a hotel room, six percent is added to the room rate for the transient occupancy tax. Although this is not currently a major revenue source for the County, any new hotel space in the unincorporated portion of the county would generate additional Transient Occupancy Tax (TOT) revenues for the County's General Fund. As tourism becomes a more important economic generator within the county over time, this will become a more significant revenue source.

5. Fiscal Implications of Growth

The budget data presented thus far demonstrate that the County provides a wide array of services to benefit the cities as well as the unincorporated areas. To fund these services, the County is largely dependent upon restricted revenues from sources that are beyond its control and which do not necessarily increase in proportion to the County's costs of providing the services. To further complicate the County's challenges in managing its budget, much of the demand (and costs) for County services stems from development within the incorporated cities, yet the County has no control over the development that occurs within the cities.

Although the County has jurisdiction over development in the unincorporated areas, it still must be aware of the potential for cities to expand by annexing adjacent unincorporated areas. When this occurs, certain revenues that currently accrue to the County, will be transferred over to the annexing city. And although some of the County's service responsibility will transfer over to the annexing city, the County will still retain service responsibilities that are equal to 63 percent of total per capita costs and 51 percent of net per capita costs for each resident that is annexed into a city. In light of this, it is very important for the County and cities to cooperate to ensure that revenue sharing agreements that accompany annexations will leave the County with sufficient revenues to continue to maintain adequate levels of services for all county residents.

When contemplating development within the unincorporated areas, the County will find that certain types of development will be more fiscally advantageous than others. Initially, it appears that commercial and industrial development will be most beneficial to the County, because it will generate a full range of revenues; however, without a residential population component, demand for costly County services in the Health and Human Services and Public Protection areas will be low.

6. Other Funding Mechanisms: Development Impact Fees

Butte County currently collects impact fees from new developments, both residential and commercial, within the unincorporated portion of the county. These fees vary depending on the type of development and location, in accordance with the assessed impacts on County facilities. Residential impact fees cover Library facilities, vehicles, and materials; General Government facilities, vehicles, and equipment; Sheriff Department facilities, vehicles, and equipment; road improvements; Fire Department facilities, vehicles, and equipment; and Jail facilities. However, within the Chico Urban Area, a street facilities fee replaces the roads impact fee applied in the rest of the unincorporated portion of the county. Furthermore, developments within the North Chico Specific Plan area pay impact fees for parks, trails, roads and bridges, storm drainage, and fire department facilities.

The County's impact fees were last updated in 2017 based on a comprehensive impact fee study. The calculated impact fees for new developments only include those projects' fair share of impacts.

4 ENVIRONMENTAL JUSTICE

Low-income residents, communities of color, indigenous peoples and tribal nations, and immigrant communities have disproportionately experienced some of the greatest environmental burdens and related health problems throughout the history of our country. This inequity is the result of many historical factors: inappropriate zoning and negligent land use planning, failure to enforce proper zoning or conduct regular inspections, deed restrictions and other discriminatory housing and lending practices, limited political and economic power among certain demographics, the prioritization of business interests over public health, development patterns that tend to concentrate pollution and environmental hazards in certain communities, and the placement of economic and environmental benefits in more affluent areas.

The combination of a lack of economic resources and a history of unjust policy making means that these "disadvantaged communities" (as defined by Senate Bill [SB] 535) often continue to face significant barriers to overall health, livelihood, and sustainability. Disadvantaged communities (sometimes abbreviated as DACs) often have limited access to the health-promoting benefits of healthy communities, and instead experience a greater share of health-harming burdens. This is social and economic dynamic is referred to as environmental justice and can look like:

- Only having the option to rent or buy homes that are next to incompatible or unhealthy uses, like warehouses, industrial sites, freeways, or waste management facilities.
- Being unable to access high-quality and well-maintained public services or amenities, such as schools, parks, libraries, or community centers because the quality of these public amenities is often determined by the property values of homes—and property values of homes near incompatible uses are often lower than in areas without these incompatibility issues.
- Not being considered in or not having decision-making power during the review of projects and proposals that can often lead to even higher concentrations of health-harming burdens in your neighborhood.

Changes to the physical realm in which we live, work, learn, and play can help to address these barriers by reducing exposure to pollution, improving public facilities and housing, expanding access to healthy food and physical activity, and engaging citizens in the decision-making process. This chapter provides an analysis of Butte County's environmental justice indicators to help inform the development of strategies to achieve a more equitable and environmentally just future.

A. Regulatory Setting

1. Senate Bill 1000

California SB 1000, the Planning for Healthy Communities Act, passed in 2016. The law requires that General Plans address environmental justice in DACs within the area covered by the General Plan.

"Environmental justice" is defined in California law as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. California law further states that environmental justice includes, but is not limited to, the following:

- The availability of a healthy environment for all people.
- The deterrence, reduction, and elimination of pollution burdens for populations and communities experiencing the adverse effects of that pollution, so that the effects of the pollution are not disproportionately borne by those populations and communities.
- Governmental entities engaging and providing technical assistance to populations and communities most impacted by pollution to promote their meaningful participation in all phases of the environmental and land use decision-making process.
- At a minimum, the meaningful consideration of recommendations from populations and communities most impacted by pollution into environmental and land-use decisions.

DACs are defined as low-income areas that are disproportionately affected by environmental pollution and other hazards that can lead to negative health effects, exposure, or environmental degradation. The term "disadvantaged community" comes directly from State law; however, some communities prefer alternative terminology, such as environmental justice communities, communities of concern, or frontline communities.

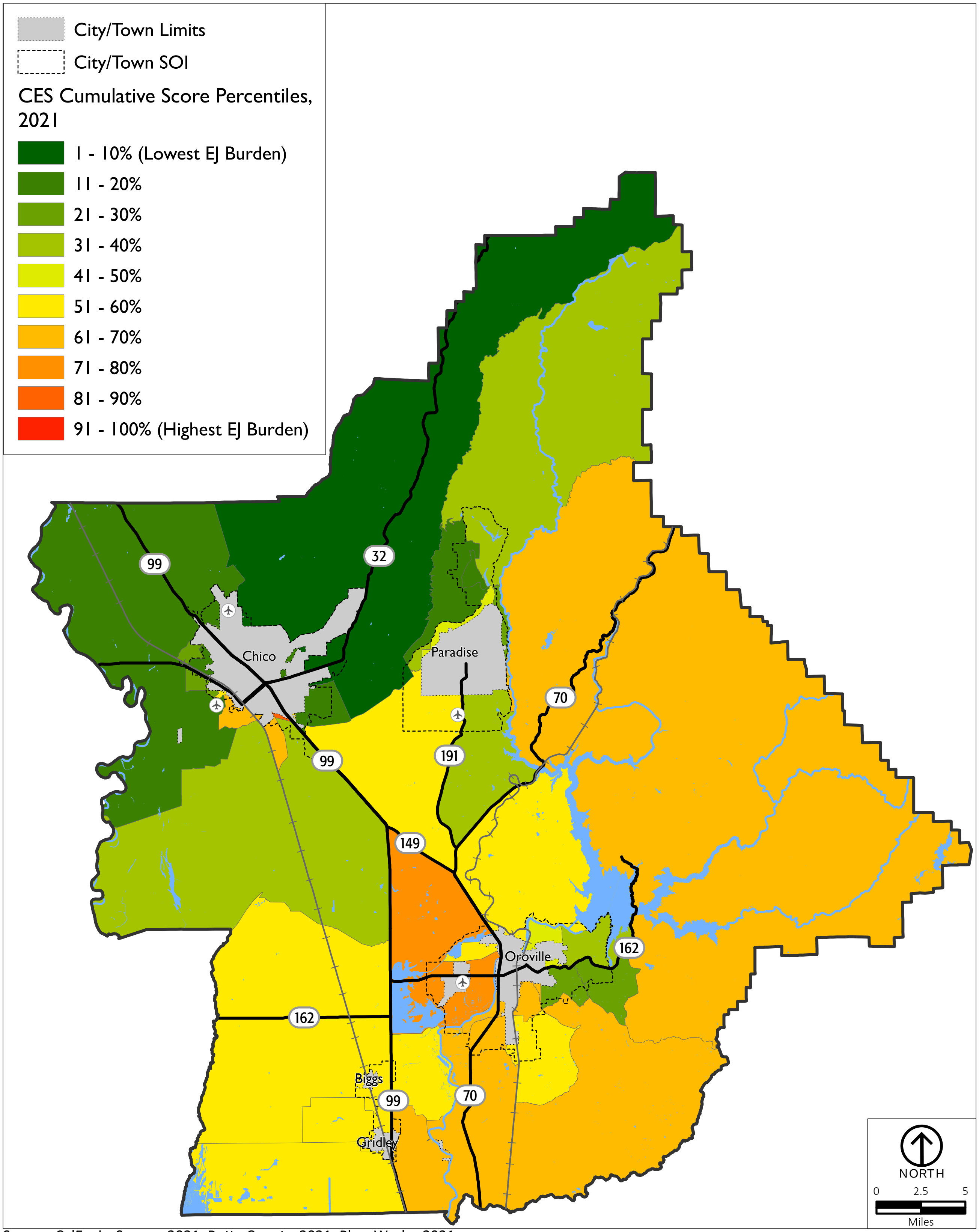
Environmental justice goals, policies, and objectives must do the following:

- Reduce the unique or compounded health risks in disadvantaged communities by reducing pollution exposure and promoting public improvements; public services; community amenities; and access to food, safe and sanitary homes, and physical activity.

- Promote civil engagement in the public decision-making process.
- Prioritize improvements and programs that address the needs of DACs.

SB 1000 defines DACs per California Health and Safety Code Section 39711, specifying CalEnviroScreen as the primary screening method for identifying DACs. Interactive CalEnviroScreen mapping is available online at: https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30.

CalEnviroScreen quantifies a range of factors related to the combination of pollution burden and population characteristics (e.g., poverty, educational attainment, and age) and arrives at a score for every Census tract. In general, the higher the score, the more impacted a community is. Census tracts in the highest quartile of scores (i.e., 75 to 100 percent) are considered DACs under SB 1000, although the law encourages local agencies to work with community members and stakeholders to refine the boundaries of these communities and identify additional communities, if appropriate, to support planning efforts to improve environmental justice. Figure 4-1 shows CalEnviroScreen scores for Butte County Census tracts.



Source: CalEnviroScreen, 2021; Butte County, 2021; PlaceWorks, 2021.

FIGURE 4-1

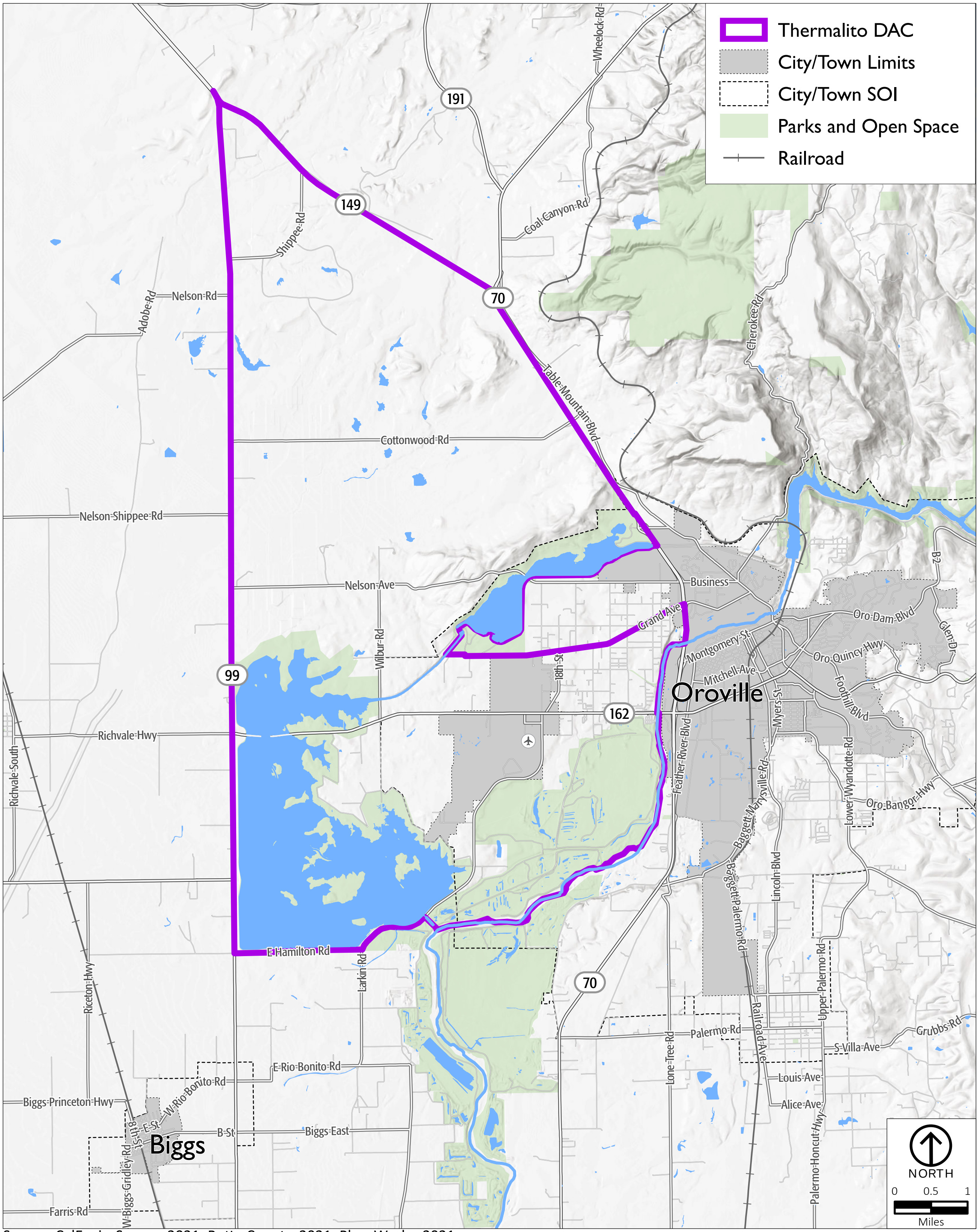
CALENVIROSCREEN SCORES

B. Existing Conditions

One unincorporated Butte County Census tract in Thermalito scores higher than the 75th cumulative percentile for CalEnviroScreen scores (i.e., this Census tract is among the 25-percent most impacted Census tracts throughout the state), and thus is considered a DAC according to the SB 1000 definition. As shown on Figure 4-2, the Thermalito DAC is in the Oroville area. This tract scores in the 78th percentile and includes some single-family residential areas just north of Oro Dam Boulevard West, rural residential areas northwest of the Oroville Airport, and the nonresidential part of Thermalito, including the Oroville Shooting Range and Clay Pit State Vehicular Recreation Area.

In addition to the Thermalito DAC, Figure 17-4 in Chapter 17, Hazards and Safety, shows the burn perimeters of the 2018 Camp Fire and the 2020 North Complex Fire. The Census tract with the highest environmental justice burden within these burn areas is a large Census tract that encompasses the Concow and Berry Creek areas; this tract scores in the 68th percentile for environmental justice burden according to CalEnviroScreen.

The map shown on Figure 4-2 is only a preliminary map of DACs based on CalEnviroScreen scores. Through the General Plan update, the County will engage with communities in Butte County to refine this map as needed.



Source: CalEnviroScreen, 2021; Butte County, 2021; PlaceWorks, 2021.

FIGURE 4-2

PRELIMINARY DISADVANTAGED COMMUNITY BOUNDARY

Table 4-1 shows percentiles for each individual factor included in the CalEnviroScreen cumulative score for the Thermalito DAC, including pollution burdens and population characteristics. Table 4-2 provides additional demographic information about this DAC compared to the rest of the county and state.

TABLE 4-1 CALENVIROSCREEN RANKINGS BY FACTOR

CalEnviroScreen Factor	Thermalito DAC
Overall CalEnviroScreen Percentile (cumulative score based on all factors)	**78%**
Overall Pollution Burden Percentile (cumulative score based on the following factors)	**53%**
Air Quality: Ozone Concentration	67%
Air Quality: Fine Particle ($PM_{2.5}$) Concentration	18%
Diesel Particulate Matter Emissions	16%
Concentration of Drinking Water Contaminants	60%
Pesticide Use	76%
Concentration of Toxic Releases	10%
Traffic Density	16%
Concentration of Clean-Up Sites	40%
Susceptibility to Groundwater Threats	0%
Density of Hazardous Waste Facilities	41%
Proximity to Impaired Water Bodies	74%
Proximity to Solid Waste Sites	63%
Population Characteristics Percentile (cumulative score based on the following factors)	**89%**
Asthma-Induced Emergency Room Visits	69%
Heart Attack-Induced Emergency Room Visits	97%
Low Birth Weight Infants	86%
Population Without a High School Degree	75%
Housing Burdened Low-Income Households	49%
Limited English-Speaking Households	38%
Households Living Below the Federal Poverty Line	92%
Relative Unemployment	96%

Source: CalEnviroScreen, 2021.

TABLE 4-2 ADDITIONAL DEMOGRAPHIC INFORMATION

Population Characteristic	California Average	Butte County Average	Thermalito DAC
Total Census Tract Population	4,500	4,428	4,746
Children under 10	13%	12%	13%
Population over 65	12%	18%	16%
Median Age	36.5	36.9	40.1
Population identifying as something other than White Alone*	73%	29%	37%
Median Household Income	$80,440	$62,563	$32,401
Average Life Expectancy	81.3	77.7	74.5

*Includes Hispanic/Latino of any race.
Sources: CalEnviroScreen, 2021; U.S. Census American Community Survey 5-year Estimates, 2019; CDC National Center for Health Statistics, 2020.

Overall, the Thermalito DAC scores in the 53rd percentile for pollution burden characteristics and in the 89th percentile for population vulnerability characteristics, indicating that the DAC status of this community is most strongly driven by its health, demographic, and related characteristics, as opposed to exposure to pollution.

In particular, the Thermalito DAC has high unemployment rates and high rates of households living below the federal poverty line compared to the rest of California. Households in this area have low incomes but also a lower housing cost burden. The Thermalito DAC has a slightly higher proportion of residents that are people of color compared to the rest of the county, but lower than throughout the state; average life expectancy is shorter than the rest of the county and state. The DAC's pollution burden is highest in the categories of pesticide use and proximity to impaired water bodies. This DAC scores above the 75th percentile for the following factors:

- ♦ Pesticide use
- ♦ Heart attack-induced emergency room visits
- ♦ Low birth weight infants
- ♦ Population without a high school degree
- ♦ Households below the federal poverty line
- ♦ Relative unemployment

5 TRANSPORTATION AND CIRCULATION

A. *Introduction*

A community is both defined and constrained by the network of highways, roads, streets, waterways, and railways that move its residents and goods through and in and out of the area. This chapter discusses the various elements of Butte County's transportation network. It draws from the 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), prepared by the Butte County Association of Governments (BCAG) and adopted on December 10, 2020. As the Regional Transportation Planning Agency, BCAG updates this countywide plan every three years.

The geography of Butte County constrains transportation and circulation. In the flat valley of the southwestern portion of the county, the circulation system is affected most significantly by the Feather River. The river bisects the lower portion of the county running south. In the foothills and mountains of the eastern part of the county, travel is limited to east-west roadways that run through valleys and canyons. Man-made barriers also constrain automobile traffic. For instance, the circulation system is affected by the railroad tracks running north-south parallel to the state highways. Together, the river and railroad tracks facilitate north-south travel, though they also hinder east-west travel in the southern portion of the county.

This chapter focuses on transportation-related components of the circulation system, the General Plan Circulation Element also addresses utility and electrical corridors, as is suggested by State of California law. The latter aspects are discussed in Chapter 14 of this Setting and Trends Report.

B. *Existing Roadway System*

This section describes Butte County's existing network of roadways. As shown in Table 5-1, Butte County has more than 2,000 miles of public roadways, which are under the jurisdiction of various government entities. These roadways carry an estimated 4,648 million miles of travel demand annually, according to the 2019 *California Public Road Data: Statistical Information Derived from the Highway Performance Monitoring System* report from the California Department of Transportation (Caltrans). Figure 5-1 shows the major roadway facilities in Butte County.

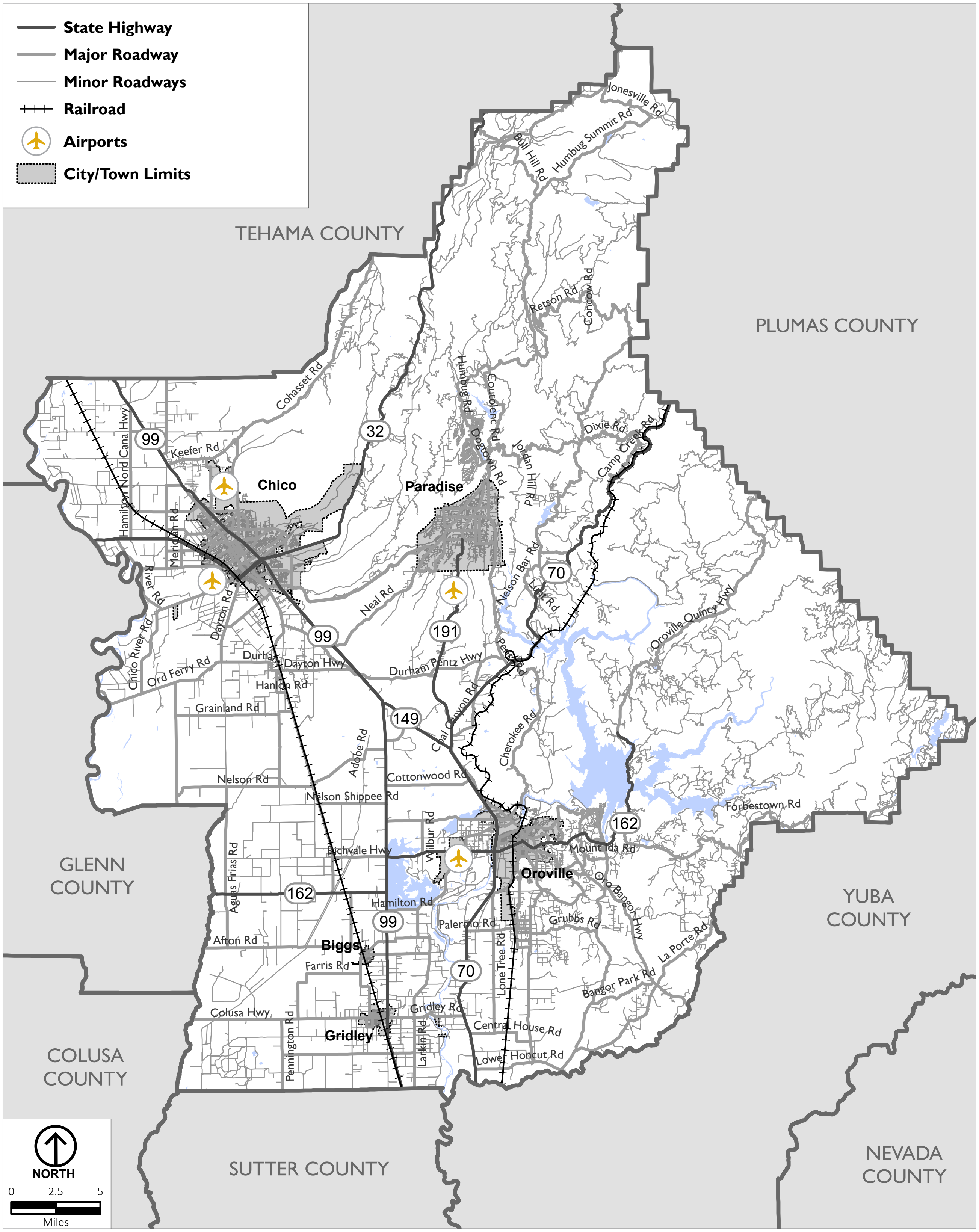
TABLE 5-1 MAINTAINED ROAD MILEAGE IN BUTTE COUNTY, 2019

Jurisdiction	Total Maintained Road Miles
City of Biggs	11.7
City of Chico	276.4
City of Gridley	28.9
City of Oroville	99.0
Town of Paradise	103.2
Subtotal (Cities)	**519.2**
Butte County (Unincorporated)	1,265.6
State Highway	183.5
State Parks and Recreation	26.0
U.S. Bureau of Indian Affairs	0.2
U.S. Forest Service	68.9
Total	**2,063.4**

Source: 2019 California Public Road Data: Statistical Information Derived from the Highway Performance Monitoring System. Caltrans.

1. Functional Classification and Design Standards of Roadways

Butte County's roadways can be described in terms of a hierarchy based on their functional classification and their classification as either urban or rural roads. The County's roadway hierarchy encompasses freeways, expressways, regional highways, and urban and rural arterials, collectors, and local roads, each of which is described in further detail herein. It is necessary to differentiate between urban and rural areas since the services they provide can differ greatly.



Source: Butte County GIS, 2021.

Figure 5-1
Existing Transportation System

Butte County has developed improvement standards for these various classes of roads; these are contained in Appendix II of the Butte County Improvement Standards, adopted by the Board of Supervisors in October 2006 and all subsequent amendments.[1]

This hierarchy of roadways is only a general guide to the classification of the county's roadways. Roadways often serve dual functions and cannot be definitively classified. In addition, the design of a roadway does not always correspond directly to its function. For example, although wider roadways tend to have a more regional function, this is not always the case.

a. Freeways, Expressways, and Regional Highways

The following classifications of roadway serve both rural and urban areas by providing travel on important, high-volume corridors.

i. Freeways and expressways

Freeways and expressways are intended to serve both intra-regional and inter-regional travel. They provide no access to adjacent properties, but rather are fed traffic from collector and arterial roadways by access ramps at interchanges. Freeways provide connections to other regional highways and are capable of carrying heavy traffic volumes. Speed limits on freeways are usually between 55 and 65 miles per hour.

ii. Regional Highways

Regional highways are used as primary connections between major traffic generators or as primary links in state and national highway networks. Such routes often have sections of many miles through rural environments without traffic control interruptions. Some local access to parcels may be provided, particularly in rural areas.

[1] Copies of these Improvement Standards are available from the Department of Public Works' website at: https://www.buttecounty.net/publicworks/Divisions/Land-Development/Improvement-Standards

b. Urban Roadway Classes

i. Urban Arterial Roadways

Urban arterial roadways are fed by local and collector roads and provide intra-city circulation and connection to regional roadways. They can be further divided into major and minor facilities. Although their primary purpose is to move traffic, arterial roadways often provide access to adjacent properties, especially in commercial areas. Speeds on urban arterial roadways are typically moderate to high.

ii. Urban Collector Roadways

Urban collector roadways are intended to collect traffic from local roadways and carry it to roads higher in the hierarchy of classification. Collector roads also serve adjacent properties. They generally carry light to moderate traffic volumes, with speeds typically in the moderate range.

iii. Urban Local Roadways

Urban local roadways are intended to serve adjacent properties only. They are intended to carry very little, if any, through traffic and generally have low volumes. They are normally discontinuous in alignment to discourage through traffic, although they are occasionally laid out in a grid system. Speeds on local roads are typically low.

c. Rural Roadway Classes

i. Rural Arterial Roadways

Rural arterial roadways generally provide for substantial intra-state and inter-state travel, as indicated by trip lengths and volumes along such corridors. These facilities are often regional highways or freeways (described above) that link urban centers of 50,000 or more people and other significant population centers of up to 25,000 people. Speeds on rural arterial roadways are typically moderate to high.

ii. Rural Collector Roads

Rural collector roads serve travel that is primarily intra-county rather than of regional or statewide importance. Travel distances on these roads are usually shorter than on arterial roadways. Speeds on rural collector roads are typically moderate.

iii. Rural Local Roads

Rural local roads primarily provide access to adjacent land and travel over relatively short distances. Speeds on rural local roads are typically low to moderate.

2. Major Roadways in Butte County

a. Freeways

Butte County has three segments of four-lane limited-access freeway or expressway. One segment is State Route (SR) 70 between 0.4 miles south of SR 162 through Oroville to the junction of SR 149. The other segment is SR 99 starting at the SR 99/SR 149 intersection and continuing through Chico to 1 mile north of the Eaton Road interchange. These segments are part of the north-south travel corridor of SR 99 and part of SR 70, as described below. SR 149 links the expressways on SR 99 and SR 70.

b. Regional Highways

Six designated State Routes (SRs) serve as regional highways in Butte County. These highways, which provide the primary access through the county, are listed in Table 5-2.

c. Other Significant Roadways

A number of regionally significant arterial and collector roadways in Butte County serve the County's regional population areas. Most of these are part of the County's roadway network.

TABLE 5-2 REGIONAL HIGHWAYS IN BUTTE COUNTY

Regional Highway	Description/Function
SR 99	SR 99 travels north-south, connecting Butte County with Yuba City, Marysville, and Sacramento to the south and Red Bluff to the northwest. It directly serves the communities of Gridley, Biggs, and Chico.
SR 70	SR 70 begins in Sutter County, where it splits from SR 99 south of Yuba City/Marysville. It serves Oroville and then continues to the northeast into Plumas County.
SR 149	SR 149 connects the Chico area to Oroville. This 4.62-mile highway connects SR 70 north of Oroville with SR 99 south of Chico.
SR 191	SR 191 is an access route to the Paradise Ridge area and to Butte College. It begins at SR 70 approximately 1.4 miles northeast of the junction with SR 149 and continues north to the Town of Paradise.
SR 162	SR 162 provides east/west access for Oroville and the southern part of Butte County. It runs from the Glenn County line to the foothills east of Oroville, serving the Oroville Dam recreation area.
SR 32	SR 32 is an east-west highway between Orland and Chico. It also runs northeast from Chico through Forest Ranch toward Lake Almanor.

The RTP/SCS identifies regionally significant roadways, including the entire State highway system and all roads designated as either arterial or collector, as classified by each local jurisdiction. In addition, roadways that meet one or more of the following criteria are identified as other roads of regional significance:

- ♦ Principal roadways connecting Butte County with other regions or counties
- ♦ Principal roadways connecting urban areas
- ♦ Roadways that provide access to significant recreational, commercial, industrial, or institutional activities
- ♦ Roadways that are primary emergency evacuation routes for urban areas.

These roadways are described in Table 5-3 and illustrated in Figure 5-1.

TABLE 5-3 REGIONALLY SIGNIFICANT ARTERIAL AND COLLECTOR ROADWAYS SERVING THE UNINCORPORATED COUNTY AREA

Roadway	Description/Function
Hamilton-Nord-Cana Highway	Two-lane north-south roadway that runs between SR 32 and SR 99 west of Chico.
West Sacramento Avenue	East-west roadway running between River Road and SR 32 west of Chico and continuing to Esplanade within the city. It has two lanes west of SR 32.
Chico River Road	Two-lane east-west roadway running between River Road and SR 32 west of Chico.
Ord Ferry Road	Two-lane east-west road between the Sacramento River at Ord Bend and Dayton Road.
Durham-Dayton Highway	Two-lane continuation of Ord Ferry Road from Dayton Road to SR 99.
Midway	Two-lane road that runs parallel and west of SR 99 between SR 162 and the end of Park Avenue south of Chico.
Colusa Highway	Two-lane east-west roadway running between the Colusa County line and West Biggs Gridley Road in the southwest portion of the county.
Cohasset Road	Five-lane north-south roadway beginning at SR 99 north of Chico to Eaton Road and two-lane from Eaton Road running to the Tehama County line.
Esplanade	A north-south roadway running from SR 99 in the area north of Chico and continuing through Chico to Main Street and Broadway, which form three-lane components of a north-south one-way couplet in the downtown area.
Skyway	An east-west link between south Chico and Paradise and a north-south road from Paradise to Humboldt Road at Butte Meadows. It has four lanes from Park Avenue to Bille Road in the Town of Paradise, with the four lanes becoming divided approximately from Honey Run Road to the Paradise Town limits. It has two lanes elsewhere.

Roadway	Description/Function
Durham-Pentz Road	Two-lane continuation of Durham-Dayton Highway running east-west between SR 99 and Pentz Road.
Pentz Road	Two-lane north-south road running from SR 70 north of Oroville to Skyway north of Paradise.
Cherokee Road	Two-lane road running north-south between Table Mountain Boulevard in Oroville and SR 70 north of Oroville.
Forbestown Road	Two-lane east-west roadway running between SR 162 east of Oroville and La Porte Road near the Yuba County line.
Oroville-Bangor Highway	Two-lane road running east-west from Lincoln Boulevard to Miners Ranch Road and north-south from Miners Ranch Road to La Porte Road in the southeast part of the county.
Lower Wyandotte Road	Two-lane road running east-west from Foothill Boulevard to Upper Palermo Road and north-south from there to SR 162.
Upper Palermo Road and the Palermo-Honcut Highway	Two-lane roads running generally north-south between Lower Wyandotte Road and Honcut.
La Porte Road	Two-lane roadway running in a northeasterly direction from the Yuba County line to the Plumas County line roughly following the southeast boundary of Butte County.
Palermo Road	Two-lane road running east-west from SR 70 to the Palermo-Honcut Highway south of Oroville.
Table Mountain Boulevard	Roadway roadway running roughly parallel to SR 70 in a northerly direction from Montgomery Street in Oroville to SR 70 north of SR 149. It is generally a two-lane road, with segments that are three, four, and five lanes in Oroville.
East Oroville Dam Boulevard	Oroville Dam Boulevard continues to run east of SR 162 at the Olive Highway, after which it becomes East Oroville Dam Boulevard from east of Foothill Boulevard to the Oroville Dam. It is generally a two-lane road. The unincorporated County portion runs roughly from Glen Drive easterly to the Oroville Dam.
Lumpkin Road	Two-lane road running southeasterly from Forbestown Road to the east junction of the Lumpkin-LaPorte Road near Feather Falls.
Honey Run Road, Centerville Road, and Nimshew Road	A series of two-lane roads running roughly parallel to and north of Skyway between Chico and Paradise.
Oroville-Quincy Highway	Two-lane continuation of SR 162 east of Oroville, between Foreman Creek Road and the Plumas County line.
Larkin Road and Biggs East Highway	Two-lane roads running between SR 162 in the Thermalito area west of Oroville to SR 99 near Biggs and Gridley.
East Gridley Road	Two-lane road running east-west between SR 99 and SR 70 east of Gridley.

Source: BCAG 2020, Appendix 7, accessed March 2021.
http://www.bcag.org/documents/planning/RTP%20SCS/2020%20RTP%20SCS/Appendices/Appendix%207%20Final.pdf

d. Collision Data Analysis

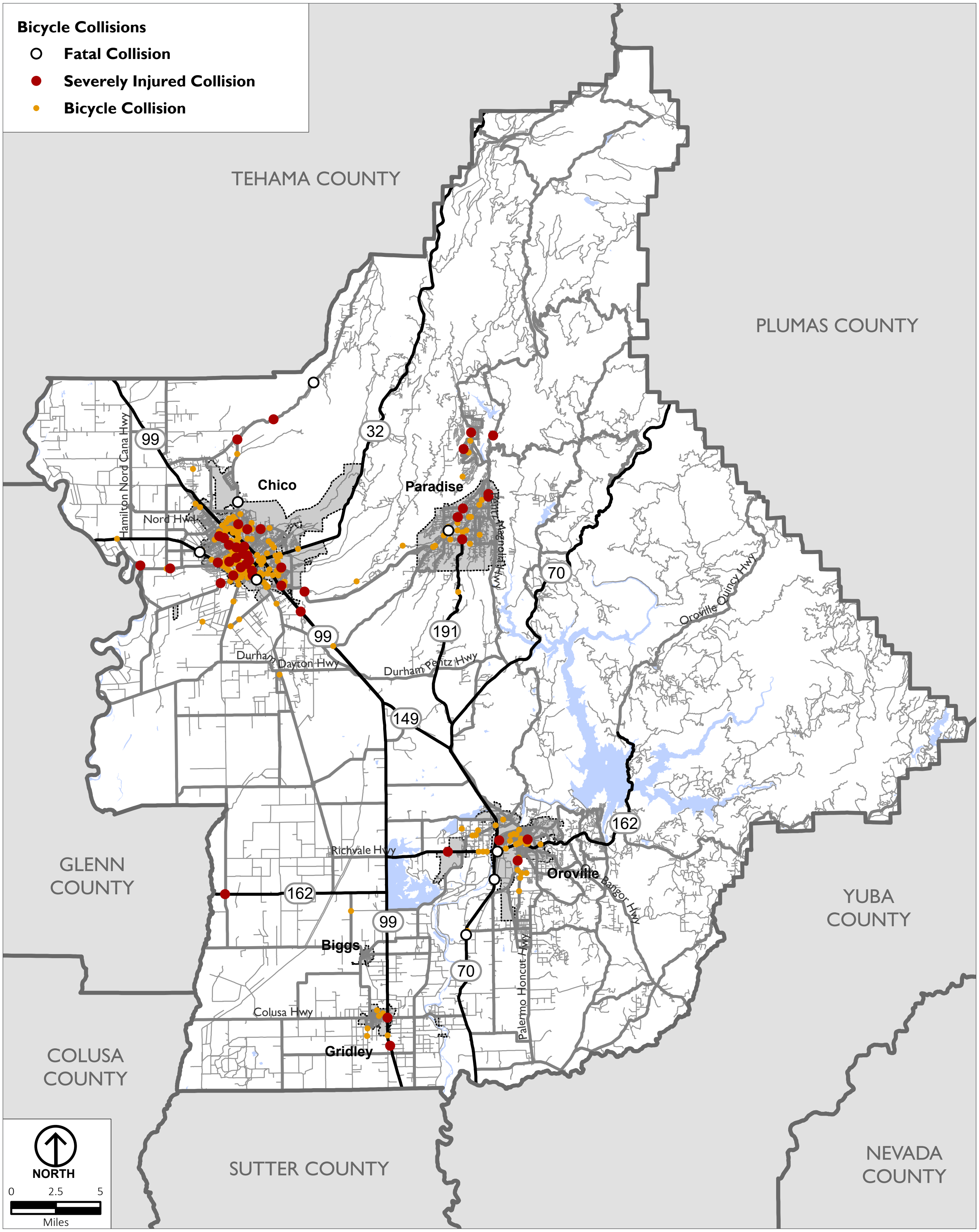
Table 5-4 shows the number of fatal and injury collisions in Butte County from 2012 to 2018. The data show all reported collisions, including collisions that occurred on roads maintained by Caltrans, Butte County, and local cities. While there is no clear trend in pedestrian-vehicle collisions, there is a steady decline in total bicycle collisions, which may be related to construction of bike facilities over the past decade. There was a spike in total collisions in 2016 by about 17 percent and stayed nearly constant through 2018. These numbers should be reviewed in the context of vehicle miles traveled (VMT) to understand how various factors that include the completion of safety projects, regional population growth, land use changes, and increased traffic volumes influence historical collision data.

TABLE 5-4 SUMMARY OF BUTTE COUNTY INJURY AND FATAL COLLISIONS (2012-2018)

	Total Collisions			Pedestrian-Vehicle Collisions			Bicyclist-Vehicle Collisions		
Year	Injury	Fatality	All Collisions	Injury	Fatality	All Collisions	Injury	Fatality	All Collisions
2012	98	23	888	12	3	48	6	4	90
2013	88	19	872	11	5	68	7	3	84
2014	97	22	878	11	0	53	3	1	70
2015	97	31	878	9	9	54	16	0	75
2016	98	32	1,029	16	12	70	4	1	76
2017	114	33	1,022	12	6	71	5	4	62
2018	158	36	1,010	14	6	51	14	3	72
Total	750	196	6,577	85	41	415	55	16	529

Source: BCAG, RTP/SCS (2020).

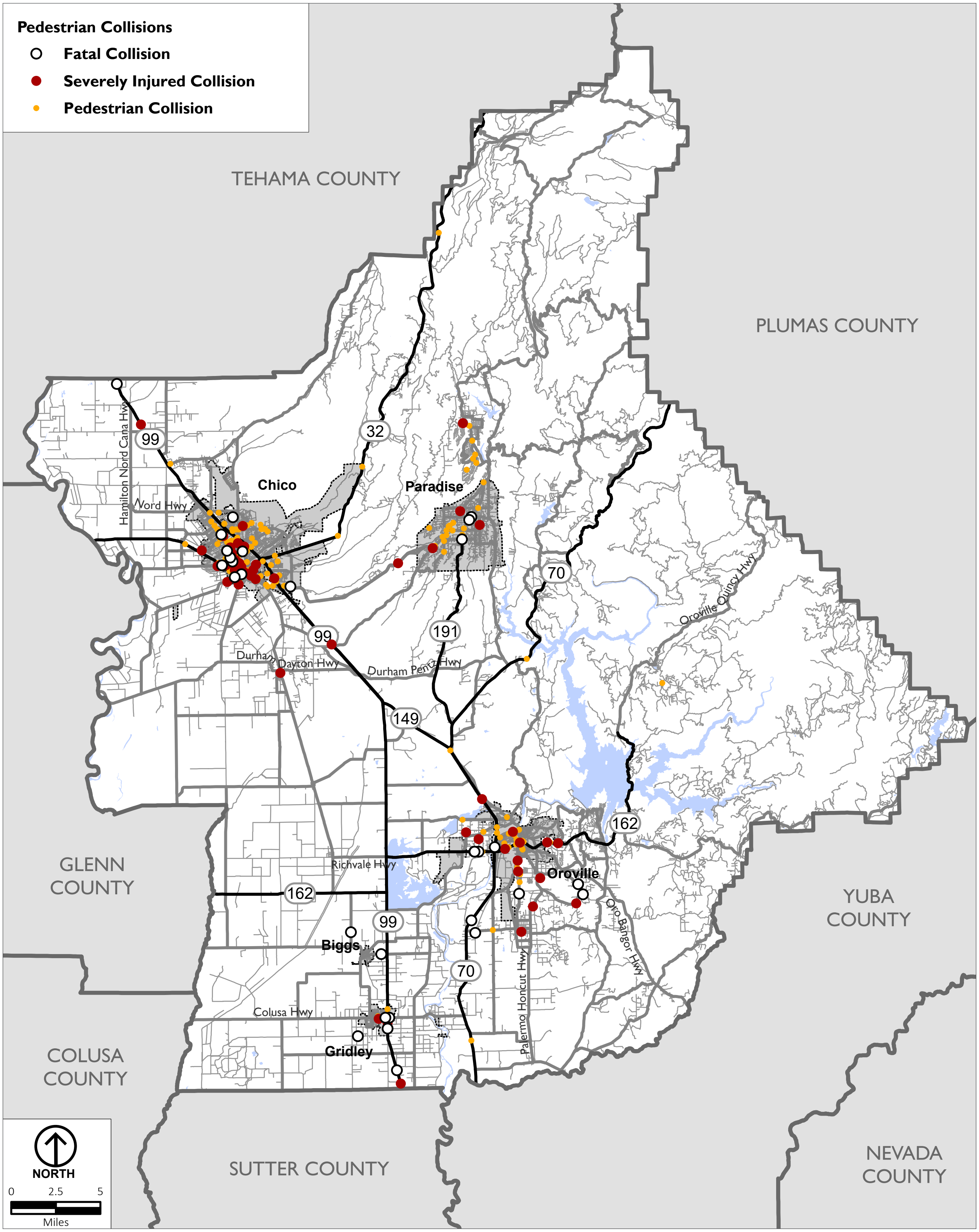
Figure 5-2 shows the collisions involving bicyclists and motorists that occurred in Butte County over the five-year period of 2014 to 2018. Figure 5-3 shows the collisions that occurred over the same five-year period involving pedestrians and motorists. As shown in Table 5-4 with data from the BCAG RTP/SCS, a total of 6,577 collisions were reported over the seven-year period of 2012 to 2018. These statistics illustrate that the vast majority of collisions involving bicyclists and pedestrians occurred in the incorporated cities in Butte County.



Source: California Highway Patrol (CHP). Statewide Integrated Traffic Records System (SWITRS).

Figure 5-2

Bicycle Collisions, 2014-2018



Source: California Highway Patrol (CHP). Statewide Integrated Traffic Records System (SWITRS).

Figure 5-3

Pedestrian Collisions, 2014-2018

C. Planned/Proposed Regional Transportation Improvement Projects

BCAG is responsible for preparing and updating an RTP/SCS every three years. The RTP/SCS identifies the regional transportation needs of the Butte County region, proposes a program of regional capital and operational improvements needed within the next 20 years, and recommends a package of revenue increases to fund the proposed program. The most recent RTP/SCS was adopted by BCAG on December 10, 2020.

The RTP/SCS identifies the future regional transportation needs and serves as the foundation for the preparation of the Regional Transportation Improvement Program (RTIP) and the Federal Transportation Improvement Program (FTIP). The 2020 RTP/SCS outlined 16 goals related to each policy area:

- Highways, Streets, and Roads: Provide a safe and efficient regional road system that accommodates the demand for movement of people and goods.
- Transit: Provide an efficient, effective, coordinated regional transit system that increases mobility for urban and rural populations, including those located in disadvantaged areas of the region.
- Rail: Provide a rail system that provides safe and reliable service for people and goods.
- Goods Movement: Provide a transportation system that enables safe movement of goods in and through Butte County.
- Aviation: Provide a fully functional and integrated air service and airport system complementary to the countywide transportation system.
- Non-Motorized Transportation: Provide a regional transportation system for bicyclists and pedestrians.
- Intelligent Transportation System (ITS): Promote the use of ITS technologies in the planning and programming process.
- Energy: Reduce usage of nonrenewable energy resources for transportation purposes.
- Air Quality: Achieve air quality standards set by the Environmental Protection Agency (EPA) and the California Air Resources Board (CARB).
- Land Use Strategies: Provide economical, long-term solutions to transportation problems by encouraging community designs that promote walking, public transit, and bicycling.

- Transportation Financing: Develop and support financing strategies that provide for continuous implementation of the RTP/SCS projects and strategies.
- Outreach and Coordination: Provide a forum for participation and cooperation in transportation planning and facilitate relationships for transportation issues that transcend jurisdictional boundaries.
- Quality of Travel and Livability:
  - Mobility: Provide for convenient travel options for people and goods and maximize the transportation system's productivity. The system should reduce both the time it takes to travel and total costs of travel.
  - Reliability: Provide a reliable transportation system so that travelers can expect relatively consistent travel times from day-to-day for the same trip by mode(s).
  - System Preservation and Safety: Protect the public's investment in transportation by maintaining the transportation system. It is critical to preserve and ensure a safe regional transportation system.
- Sustainability: Incorporate sustainable community strategies into the regional transportation planning process in support of social equity, a healthy environment, and a prosperous economy.
- Emergency Preparedness: Support and collaborate on proactive emergency planning and projects that increase emergency readiness and preparedness, including upgrading and maintaining roadways, public transit, or facilities that support emergency situations.
- Housing: Support and collaborate on proactive efforts to address housing needs in the region.

The 2020 RTP/SCS contains policies, action statements, and funding recommendations to meet regional transportation needs over the next 20 years. It identifies $588 million in roadway projects for the short-term period through 2025 and prioritizes the funding for these projects. The 2020 RTP/SCS also includes $344 million in planned long-term projects on the financially constrained list, and an additional $436 million in unconstrained projects.

The top-priority projects for Butte County are transit projects, including programs to support transit services provided by Butte Regional Transit (Fixed-Route and Paratransit), as well as non-infrastructure projects for the Help Central Mobility

Management Program for Butte 211 call center and for Butte Regional Transit for supplemental Americans with Disabilities Act (ADA) paratransit operations. Due to the volume of projects, tables are provided in the RTP/SCS appendix, and mapping is not provided in the RTP/SCS but is available online at: https://gicwebsrv.csuchico.edu/webmaps/bcag_projects/prod/.

D. BCAG Travel Demand Forecasting Model

BCAG maintains a travel demand forecasting (TDF) traffic model for the Butte County region that is used to prepare existing and future year peak hour volume and level of service (LOS) estimates for the county's regional roadway network. This analysis does not constitute a standard, only an estimate, and is designed to be used for general planning purposes only. The most recent BCAG traffic model data forecasts traffic volumes for 2020, 2035, and 2040.

A traffic model is a computer program that simulates traffic levels and patterns for a specific geographic area. The program consists of input files that summarize the area's land uses, street network, travel characteristics, and other key factors. Using this data, the model performs a series of calculations to determine the number of trips generated, where each trip begins and ends, and the route taken by the trip. The model's output includes projections of traffic on major roads. The BCAG TDF model is a valuable tool for the preparation of long-range transportation planning studies.

To be accurate for projecting traffic volumes in the future, a model must first be calibrated to a year in which actual land use data and traffic volumes are available and well documented. A model is considered accurately calibrated when it replicates the actual traffic counts on the major roads within certain ranges of error set by Caltrans. The latest year for which a comprehensive set of traffic counts was obtained is 2018.

The BCAG TDF model is also consistent in form and function with the standard traffic forecasting models used in the transportation planning profession. The model includes a land use/trip generation module, a gravity-based trip distribution model, and a capacity-restrained equilibrium traffic assignment process.

1. Camp Fire Effects

The 2018 Camp Fire resulted in significant near- and long-term impacts requiring consideration for forecasting future travel demand, which are accounted for in the BCAG 2020 Travel Demand Model. The 2018 base year land use and transportation system for the model was validated using 2018 counts (pre-Camp Fire). Travel behavior inputs like trip generation were based on 2012 California Household Travel Survey (CHTS). In addition, a 2020 base year model was forecast based on the 2020 RTP land use, which accounts for land use changes after the Camp Fire, with 2020 RTP planned and programed transportation projects. The *BCAG 2020 RTP Travel Demand Model - Model Development Report* describes the model development process, including the data sources used to develop key model inputs.[2]

Once the base year model calibration and validation was complete, growth projections for each traffic analysis zone (TAZ) from BCAG staff were used to develop additional future-year scenarios, including for the Butte County General Plan 2040 horizon year.

After the Camp Fire, land uses were concentrated in other jurisdictions while Paradise recovered. This caused a change to interregional travel that was not reflected in the base year data. This was especially true for work and shopping trips in 2020 and non-home-based trips in the future scenarios. To capture the change to interregional travel, the interregional trip percentages were modified to reflect a better balance of trips staying within Butte County. As an additional result of the displacement of Paradise's residents and employment, the 2020 land use has a much higher occupancy rate than 2018 and is more distributed within existing communities. After 2020, rebuilding in Paradise is forecast to proceed at a high rate, with a majority being single-family residential units.

The model results show that vehicle-miles traveled (VMT) per capita decreased between 2018 and 2020 due to the higher occupancy and density of development without having a substantial amount of new development in Paradise.

[2] BCAG 2020 RTP Travel Demand Model - Model Development Report (September 2020). http://www.bcag.org/documents/planning/traffic%20model/BCAG_ModelDevelopmentReport_2020.pdf

2. Level of Service (LOS) and Vehicle Miles Traveled (VMT)

Establishing roadway level of service (LOS) allows transportation planners to evaluate traffic operating conditions and provides a basis for comparison of operating conditions. A roadway or street segment is assigned a LOS grade that corresponds to its quality of traffic operations. A LOS grade of "A" indicates high-quality service; a LOS grade of "F" indicates low-quality service.

Table 5-5 presents the characteristics associated with each LOS grade. As shown in the table, LOS "A," "B," and "C" are considered satisfactory to most motorists, while LOS "D" is marginally acceptable. LOS "E" and "F" are associated with severe congestion and delay and are unacceptable to most motorists.

It is common in traffic engineering practice to design, maintain, and improve street facilities in order to maintain LOS "C" or better, except in congested urban areas where this policy would be uneconomical. The policies of the cities of Chico and Oroville, the Town of Paradise, Butte County, and Caltrans concur with this, though their evaluation criteria and degrees of "strictness" vary.

TABLE 5-5 PEAK-HOUR LEVEL OF SERVICE DESCRIPTIONS

Level of Service	Traffic Flow Quality
A	Represents free flow. Individual users are virtually unaffected by others in the traffic stream. Control delay at signalized intersections is minimal.
B	Stable flow, but the presence of other users in the traffic stream begins to be noticeable. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at signalized intersections are not significant.
C	Stable flow, but the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.
D	Represents high-density, but stable flow.
E	Represents operating conditions at or near capacity level.
F	Represents forced or breakdown flow.

Source: Highway Capacity Manual, 2000. Transportation Research Board, Washington, D.C.

The LOS thresholds used in BCAG's TDF model were developed based on methodologies described in the 2000 Highway Capacity Manual (HCM). The thresholds are based on peak-hour traffic volumes and are detailed in Table 5-6. Although there are newer thresholds available from the Transportation Research Board, the 2000 HCM thresholds are still applicable and provide a consistent comparison across time periods with the same methodologies.

On September 27, 2013, Governor Jerry Brown signed Senate Bill (SB) 743 into law and started a process intended to fundamentally change transportation impact analysis as part of California Environmental Quality Act (CEQA) compliance. These changes include elimination of automobile delay, LOS, and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts, and instead replacing them with VMT. The LOS results are presented in Table 5-8 to evaluate compliance with the County's General Plan LOS policy and for informational purposes, but not to determine significant impacts under CEQA. Butte County is developing a VMT policy as part of the General Plan Update that will be used for future CEQA analyses.

3. BCAG TDF Model Roadway Network

In computing the TDF model results for 2040, the model includes a series of capacity-increasing roadway projects that are assumed to be constructed by 2040 and are thus incorporated in the 2040 model roadway network. These capacity-increasing roadway projects are summarized in Table 5-7.

4. BCAG TDF Model Results

Table 5-8 provides a summary of the output from BCAG's TDF model. The table identifies estimated base year (2018), a forecasted interim year (2020), and projected (2040) peak-hour traffic volumes on roads of regional significance that connect population centers with industrial, commercial, recreational, and other important uses. The 2040 projections were developed using the current Butte County General Plan land use designations. LOS is then used to express the traffic flow conditions of a road segment in relation to the capacity of the roadway. For the purposes of this analysis, LOS "A," "B," or "C" were not differentiated, but rather were grouped into a single category called LOS "C," which can be interpreted as representing LOS "C" or better.

TABLE 5-6 BCAG TRAVEL DEMAND FORECASTING MODEL PEAK-HOUR LOS THRESHOLDS

	Peak-Hour Traffic Volume					
Facility Type	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Minor 2-Lane Highway	<90	91-200	201-680	681-1,410	1,411-1,740	>1,741
Major 2-Lane Highway/ Expressway	<120	121-290	291-790	791-1,600	1,601-2,050	>2,051
4-Lane, Multi-Lane Highway/Expressway	<1,070	1,071-1,760	1,761-2,530	2,531-3,280	3,281-3,650	>3,651
2-Lane Arterial	–	–	0-970	971-1,760	1,761-1,870	>1,871
4-Lane Arterial, Undivided	–	–	0-1,750	1,751-2,740	2,741-2,890	>2,891
4-Lane Arterial, Divided	–	–	0-1,920	1,921-3,540	3,541-3,740	>3,741
6-Lane Arterial, Divided	–	–	0-2,710	2,711-5,320	5,321-5,600	>5,601
3-Lane Arterial, One way Roadway	–	–	0-1,310	1,311-2,060	2,061-2,170	>2,171
2-Lane Freeway	<1,110	1,111-2,010	2,011-2,880	2,881-3,570	3,571-4,010	>4,011
2-Lane Freeway + Auxiliary Lane	<1,410	1,411-2,550	2,551-3,640	3,641-4,490	4,491-5,035	>5,036
3-Lane Freeway	<1,700	1,701-3,080	3,081-4,400	4,401-5,410	5,411-6,060	>6,061
3-Lane Freeway + Auxiliary Lane	<2,010	2,011-3,640	3,641-5,180	5,181-6,350	6,351-7,100	>7,101
4-Lane Freeway	<2,320	2,321-4,200	4,201-5,950	5,951-7,280	7,281-8,140	>8,141
Major 2-Lane Collector	–	–	0-550	551-1,180	1,181-1,520	>1,521

Source: Highway Capacity Manual, 2000. Transportation Research Board, Washington, D.C.
These thresholds only apply to regional routes and not to local roads or other non-regional routes.

TABLE 5-7 BCAG 2020 RTP/SCS TRAFFIC MODEL ASSUMED REGIONAL CAPACITY-INCREASING PROJECTS

Title	Segment: Start	Segment: End	Project Description	2020 RTP Analysis Year: 2020	2020 RTP Analysis Year: 2040
Central House Rd Over Wymann Ravine Bridge	0.2 miles east of SR 70	-	Located at 0.2 miles east of SR 70. Scope is to replace the existing 1 lane structurally deficient bridge with a new 2-lane bridge. Bridge No: 12C011		X
SR 70 Passing Lanes (Segment 1)	0.1 mile south of Palermo Rd	Ophir Rd	SR 70, from 0.1 mile south of Palermo Road, to just north of Ophir Road/Pacific Heights intersection. Widen from 2 to 4 lanes. (EA 3H71U). Capacity increasing portion only.	X	X
SR 70 Passing Lanes (Segment 2)	Cox Ln	0.1 mile south of Palermo Rd	On SR 70, from Cox Lane to 0.1 mile south of Palermo Road. Widen from 2 to 4 lanes. (EA 3F281 & 3H720)		X
SR 70 Passing Lanes (Segment 3)	0.4 mile south of E. Gridley Rd	0.3 mile south of Butte/Yuba Co. line	On SR 70 from 0.4 mile South or East of Gridley Road to 0.3 miles South of Butte/Yuba County line. Widen from 2 to 4 lanes. (EA 3H930 & 3F282)		X
Bruce Rd Bridge Replacement Project	Bruce Rd	at Little Chico Creek	In Chico, 0.5 miles south of Humboldt Rd on Bruce Rd over Little Chico Creek. Project includes replacement of an existing 2-lane functionally obsolete bridge with a new 4-lane bridge, including reconstruction of bridge approaches. New bridge incorporates a Class I bicycle facility.		X
Guynn Rd over Lindo Channel Bridge Project	north of W Lindo Ave	-	Project is located just north of W Lindo Ave. Replace the existing 1-lane structurally deficient bridge with a new 2-lane bridge. Bridge No 12C0066		X
Bruce Rd. Widening	Skyway	SR 32	From Skyway to SR 32, widen Roadway (bridge included as separate project).		X
Commerce Court Connection	Ivy St	Park Ave	From Ivy Street to Park Ave. connect existing Commerce Ct. to Park Avenue via Westfield Lane.		X
E. 20th Street Widening	Forest Ave	Bruce Rd	From Forest Avenue to Bruce Road. Widen from 1 lane per direction to 2 lanes per direction with median.		X
Eaton Rd Widening	Hicks Ln	Cohasset Rd	From Hicks Lane to Cohasset. Widen and extend to 4 lanes with median and new bridge at Sycamore Creek Tributary.		X
Eaton Rd Widening	Cohasset Rd	Manzanita Ave	From Cohasset to Manzanita. Widen to 4 lanes with median.		X
Esplanade Widening	Eaton Rd	Nord Hwy	From Eaton Rd to Nord Highway. Widen to 4 lanes with median. Extend median south to Shasta Ave.		X
Mariposa Ave Connection	Glenshire Ln	Eaton Rd	From Glenshire Lane to Eaton Rd, add new arterial connection. 1 lane per direction.		X

Title	Segment: Start	Segment: End	Project Description	2020 RTP Analysis Year: 2020	2020 RTP Analysis Year: 2040
Notre Dame Boulevard Connection	Little Chico Creek	E. 20th St	From Little Chico Creek to E. 20th Street. Construct new 2-lane street and bridge at Little Chico Creek.		X
Midway Widening	Hegan Ln	Park Ave	From Hegan Lane to Park Ave. Widen road from 2 to 4 lanes with a median.		X
SR 99 Auxiliary Lanes (Segment 1)	Skyway I/C	E. 20th St I/C	From Skyway to E. 20th Street. Construct auxiliary lanes to the outside.		X
SR 99 Auxiliary Lanes (Segment 2)	E. 20th St I/C	SR 32 I/C	From E. 20th to SR 32. Construct auxiliary lanes to the outside. CP 18057.		X
SR 32 Widening (Segment 3)	El Monte Ave	Bruce Rd	From El Monte to Bruce Rd. Widen from 2 to 4 lanes.		X
SR 32 Widening (Segment 4)	Bruce Rd	Yosemite Dr	From Bruce Rd to Yosemite Dr. Widen from 2 to 4 lanes with signal at Yosemite.		X
SR 99 / Eaton Rd Interchange	Esplanade	Hicks Ln	Widen overpass structure (2 to 4 lanes) and ramps, construct dual-lane roundabouts.		X
SR 99 / Cohasset Road Interchange	SR 99 @ Cohasset Rd	-	Construct Southbound direct on-ramp.		X
Cohasset Road Widening (Airport Blvd to Eaton Rd)	Eaton Rd	Airport Blvd	Widen Cohasset Road (2 to 4 lanes) from Eaton Rd to Airport Blvd.		X
MLK Blvd Widening (E. Park Ave to E. 20th St)	E. Park Ave	E. 20th St	Widen MLK Blvd (2 to 4 lanes) from Park Ave to E. 20th St.		X
Olive Highway Widening (Oro- Dam Blvd to Foothill Blvd)	Oro-Dam Blvd	Foothill Blvd	Widen Olive Hwy from 2 to 3 lanes from Oro-Dam Blvd to Foothill Blvd. Additional lane will be added to eastbound travel.		X

Determining where deficiencies may occur in the future is helpful in determining priorities for highway funding and for allocating limited monies to the most important projects. Table 5-8 shows that many road segments are expected to maintain or fall below LOS C by 2040, even with the capacity-increasing roadway projects shown in Table 5-7. The following roadway segments are projected to have an LOS of "F" in 2040:

- SR 32 - East Ave. to W. Sacramento Ave.
- SR 32 - W. Sacramento Ave. to W. 1st St.
- SR 32 - W. 1st St. to W. 5th St.
- SR 70 - Grand Ave. to SR 149
- SR 99 - SR 149 to Durham - Pentz Rd.
- SR 99 - Durham - Pentz Rd to Skyway
- SR 99 - East 20th to SR 32
- SR 162 - Olive Hwy. to Lower Wyandotte Rd.
- SR 162 - Lower Wyandotte Rd. to Foothill Blvd.
- Skyway - SR 99 to Notre Dame Blvd.

TABLE 5-8 BUTTE COUNTY ROADWAY PEAK HOUR VOLUMES AND LOS – 2018, 2020, AND 2040

Roadway	Segment	2018 Peak-Hour Volume	2018 LOS	2020 Peak-Hour Volume	2020 LOS	2040 Peak-Hour Volume	2040 LOS
SR 32	Muir Ave. to East Ave.	1,400	D	1,400	D	1,410	D
	East Ave. to W. Sacramento Ave.	2,150	**F**	2,160	**F**	2,160	**F**
	W. Sacramento Ave. to W. 1st St.	1,850	**F**	1,860	**F**	1,860	**F**
	W. 1st St. to W. 5th St.	2,250	**F**	2,260	**F**	2,260	**F**
	W. 5th St. to 8th/9th/Walnut St.	2,200	D	2,210	D	2,210	D
	8th St. (one-way WB),Walnut to Main	1,300	C	1,310	C	1,320	D
	9th St. (one-way EB), Walnut to Main	1,050	C	1,040	C	1,070	C
	8th St. (WB), Main to SR 99	1,650	D	1,630	D	1,810	D
	9th St. (EB), Main St. to SR 99	1,650	D	1,630	D	1,750	D
	SR 99 to Yosemite Dr.	1,600	C	1,600	C	1,970	C
	Yosemite Dr. to Humboldt Rd. (Hog Springs)	560	C	570	C	570	C
	Humboldt Rd. (H.S.) to Robert E. Lee Dr. (F.R.)	360	C	370	C	370	C
SR 70	Yuba County Line to Lower Honcut Rd.	1,400	D	1,410	D	1,410	D
	Lower Honcut Rd. to East Gridley Rd.	1,400	D	1,410	D	1,410	C
	East Gridley Rd. to Palermo Rd.	1,600	C	1,690	C	1,610	C
	Palermo Rd. to SR 162	1,800	E	2,030	C	1,810	C
	SR 162 to Montgomery St.	1,950	C	2,020	C	2,840	C
	Montgomery St. to Grand Ave.	2,600	C	2,710	C	3,740	C
	Grand Ave. to SR 149	2,750	D	2,790	D	4,060	**F**
	SR 149 to SR 191	840	C	610	C	950	C
	SR 191 to Pentz Rd.	350	C	230	C	380	C
	Pentz Rd. to Big Bend Rd. (Concow)	250	C	260	C	260	C
SR 99	Sutter County line to Archer Ave.	1,550	D	1,560	D	1,560	D
	Archer Ave. to Spruce St. (Gridley)	2,400	D	2,370	D	2,410	D
	Spruce St. to East Biggs Hwy.	1,400	D	1,310	D	1,440	D
	East Biggs Hwy. SR 162 (East)	1,200	D	1,170	D	1,240	D
	SR 162 (East) to SR 149	1,050	D	1,020	D	1,090	D
	SR 149 to Durham - Pentz Rd.	2,700	D	2,920	D	3,950	**F**
	Durham - Pentz Rd to Skyway	3,700	**F**	4,090	**F**	5,140	**F**
	Skyway to East 20th St.	5,500	C	5,100	C	6,810	D
	East 20th to SR 32	7,400	E	7,090	D	8,850	**F**

TABLE 5-8 BUTTE COUNTY ROADWAY PEAK HOUR VOLUMES AND LOS – 2018, 2020, AND 2040 (CONTINUED)

		2018		2020		2040	
Roadway	Segment	Peak-Hour Volume	LOS	Peak-Hour Volume	LOS	Peak-Hour Volume	LOS
	SR 32 to Cohasset Rd.	6,300	D	6,130	D	7,350	E
	Cohasset Rd. to East Ave.	4,600	C	4,520	C	5,340	C
	East Ave. to Eaton Rd.	3,250	C	3,210	C	3,980	C
	Eaton Rd. to Keefer Rd.	1,750	D	1,750	D	1,760	D
SR 149	SR 70 to SR 99	2,000	C	2,250	C	3,190	C
SR 162	Glenn County line to SR 99 (south intersect)	170	C	180	C	180	C
	SR 99 (north intersect) to Larkin Rd.	270	C	280	C	300	C
	Larkin Rd. to SR 70	1,350	D	1,300	D	1,740	E
	SR 70 to Feather River Blvd.	3,300	C	3,360	C	3,830	C
	Feather River Blvd. to Lincoln Blvd.	2,850	C	2,870	C	3,170	C
	Lincoln Blvd. to Olive Hwy.	3,050	C	3,060	C	3,320	C
	Olive Hwy. to Lower Wyandotte Rd.	3,050	**F**	3,050	**F**	3,350	C
	Lower Wyandotte Rd. to Foothill Blvd.	2,950	**F**	2,950	**F**	3,230	C
	Foothill Blvd. to Canyon Dr.	1,250	D	1,240	D	1,520	D
	Canyon Dr. to Forbestown Rd.	650	C	650	C	900	D
SR 191	SR 70 to Durham-Pentz Rd.	610	C	510	C	690	D
	Durham-Pentz Rd. to Airport Rd.	610	C	270	C	620	C
	Airport Rd. to Bushmann Rd.	560	C	90	C	570	C
	Buschmann Rd. to Pearson Rd.	960	D	530	C	970	D
Aguas Frias Rd.	Durham-Dayton Rd. to Grainland Ave.	56	C	60	C	60	C
	Grainland Ave. to SR 162	51	C	60	C	60	C
Biggs East Hwy.	Biggs to SR 99	183	C	190	C	240	C
	SR 99 to Larkin Rd.	250	C	260	C	260	C
Clark Rd.	Wagstaff Rd. to Skyway	872	C	640	C	880	C
Cohasset Rd.	SR 99 to East Ave.	1,983	D	1,960	D	2,180	D
	East Ave. to Lupin Rd.	1,705	C	1,730	C	1,870	D
	E. Easton Rd. to Boeing Dr.	973	D	1,040	D	1,100	C
	Lassen Ave. to Boeing Dr. (Chico M. Airport)	1,250	D	1,320	D	1,330	C
	Boeing Dr. to Keefer Rd.	300	C	310	C	310	C
	Keefer Rd. to Vilas Rd.	142	C	150	C	150	C
Colusa Hwy.	Colusa County line to Pennington Rd.	61	C	70	C	70	C
	Pennington Rd. to Biggs Gridley Rd.	293	C	300	C	330	C
	Biggs Gridley Rd. to SR 99	249	C	250	C	350	C

TABLE 5-8 BUTTE COUNTY ROADWAY PEAK HOUR VOLUMES AND LOS – 2018, 2020, AND 2040 (CONTINUED)

		2018		2020		2040	
Roadway	Segment	Peak-Hour Volume	LOS	Peak-Hour Volume	LOS	Peak-Hour Volume	LOS
Dayton Rd.	SR 32 to Hegan Lane	570	C	570	C	580	C
	Hegan Lane to Rodgers Ave.	277	C	280	C	280	C
Durham-Dayton Hwy.	Dayton Rd. to Midway	430	C	440	C	440	C
	Midway to Stanford Lane	200	C	210	C	220	C
	Stanford Lane to SR 99	162	C	180	C	200	C
Durham–Pentz Rd.	SR 99 to SR 191	763	C	890	C	930	C
	SR 191 to Pentz Rd.	222	C	200	C	240	C
East Ave. - Manzanita Ave. - Bruce Ave.	SR 32 to Cussick Ave.	1,272	C	1,270	C	1,280	C
	Cussick Ave. to Esplanade	1,888	D	1,870	D	1,970	D
	Esplanade to SR 99	1,942	D	1,910	D	2,020	D
	SR 99 to Cohasset Rd.	1,133	C	1,110	C	1,140	C
	Floral Ave. to Coleman Ct.	1,601	C	1,610	C	1,610	C
	Floral Ave. to Mariposa Ave.	1,750	C	1,760	D	1,760	D
	Mariposa Ave. to Marigold Ave.	1,000	C	1,010	C	1,010	C
	Marigold Ave. to Manzanita Ave.	1,000	C	970	C	1,010	C
	East Ave. to Vallombrosa Ave.	901	C	850	C	950	C
	California Park Dr. to SR 32	925	C	890	C	1,040	C
East Gridley Rd.	SR 99 to Larkin Rd.	515	C	590	C	690	C
	Larkin Rd. to SR 70	550	C	620	C	730	C
Eaton Rd.	Esplanade to SR 99	1,505	C	1,510	C	1,750	C
	SR 99 to Hicks Lane	950	C	970	C	1,310	C
	Hicks Lane to Cohasset Rd.	843	C	870	C	870	C
Esplanade	SR 99 to Garner Lane	100	C	110	C	110	C
	Garner Lane to Eaton Rd.	1,175	D	1,180	D	1,210	C
	Eaton Rd. to Lassen Ave.	1,378	C	1,380	C	1,450	C
	Lassen Ave. to East Ave.	1,806	D	1,810	D	1,890	D
	East Ave. to Cohasset Rd.	1,678	C	1,670	C	1,680	C
	Cohasset Rd. to E. 9th Ave.	2,011	C	2,010	C	2,060	C
	E. 2nd Ave. to E. Sacramento Ave.	1,678	C	1,670	C	1,730	C
	E. Sacramento Ave. to Main St./Broadway	1,820	C	1,800	C	1,830	C
Main St. (NB)	Esplanade/E. 1st St. to 9th St.	995	C	990	C	1,000	C
Broadway (SB)	Esplanade/E. 1st St. to 9th St.	760	C	740	C	770	C

TABLE 5-8 BUTTE COUNTY ROADWAY PEAK HOUR VOLUMES AND LOS – 2018, 2020, AND 2040 (CONTINUED)

Roadway	Segment	2018 Peak-Hour Volume	2018 LOS	2020 Peak-Hour Volume	2020 LOS	2040 Peak-Hour Volume	2040 LOS
Park Ave.	E. 9th St. to 16th St.	1,741	C	1,710	C	1,750	C
	E. 16th St. to E. 20th St.	1,507	C	1,450	C	1,510	C
	E. 20th St. to East Park Ave.	949	C	860	C	950	C
E. Park Ave.	Park Ave. to SR 99	1,612	C	1,510	C	1,620	C
Forbestown Rd.	SR 162 to Lumpkin Rd.	251	C	250	C	350	C
Hegan Lane	Dayton Rd. to S.P. Railroad tracks	295	C	300	C	300	C
	S.P. Railroad tracks to Midway	971	D	970	C	980	D
Honey Run Rd.	Skyway to Centerville Rd.	150	C	150	C	300	C
Centerville Rd.	Skyway to Honey Run Rd.	136	C	140	C	140	C
Nimshew Rd.	Centerville to Skyway	50	C	60	C	60	C
Larkin Rd.	SR 162 to E. Hamilton Rd.	503	C	440	C	810	C
	E. Hamilton Rd. to East Biggs Hwy.	244	C	250	C	250	C
	East Biggs Hwy. to E. Gridley Hwy.	118	C	120	C	150	C
	E. Evans Reimer Rd. to County line	244	C	250	C	250	C
Lincoln Blvd.	SR 162 to Marysville Baggett Rd.	1,027	C	1,070	C	1,190	C
	Marysville Baggett Rd. to Monte Vista Ave.	1,011	D	1,020	D	1,130	D
	Monte Vista Ave. to Ophir Rd.	601	C	610	C	740	C
	Ophir Rd. to Palermo Rd.	468	C	470	C	560	C
Lower Honcut Rd.	SR 70 to Palermo Honcut Hwy.	93	C	100	C	100	C
	Palermo Honcut Hwy. to LaPorte Rd.	50	C	60	C	60	C
LaPorte Rd.	Lower Honcut Rd. to Oro-Bangor Hwy.	100	C	110	C	110	C
Lower Wyandotte Rd.	SR 162 to Oro-Bangor Hwy.	599	C	600	C	640	C
	Oro-Bangor Hwy. to Ophir Rd.	600	C	590	C	640	C
	Ophir Rd. to Foothill Blvd.	600	C	590	C	690	C
Upper Palermo Rd.	Ophir Rd. to Palermo Rd.	330	C	220	C	340	C
Palermo Honcut Hwy.	Palermo Rd. to Lower Honcut Rd.	100	C	110	C	110	C
Midway	East Park Ave. to Hegan Lane	1,536	D	1,530	D	1,540	C
	Hegan Lane to Durham-Dayton Rd.	730	C	740	C	760	C
Montgomery St.	SR 70 to Lincoln Blvd.	600	C	680	C	780	C
	Lincoln Blvd. to Table Mountain Blvd.	578	C	590	C	650	C
Oroville - Bangor Hwy.	Lincoln Blvd. to Lower Wyandotte Rd.	152	C	160	C	160	C
	Lower Wyandotte Rd. to Foothill Blvd.	200	C	210	C	210	C

TABLE 5-8 BUTTE COUNTY ROADWAY PEAK HOUR VOLUMES AND LOS – 2018, 2020, AND 2040 (CONTINUED)

		2018		2020		2040	
Roadway	Segment	Peak-Hour Volume	LOS	Peak-Hour Volume	LOS	Peak-Hour Volume	LOS
	Foothill Blvd. to Swedes Flat Rd.	144	C	150	C	150	C
	N/O Swedes Flat Rd.	164	C	160	C	210	C
Palermo Rd.	Upper Palermo Rd. to Lincoln Blvd.	120	C	130	C	130	C
	Lincoln Blvd. to Lone Tree Rd.	110	C	120	C	120	C
	Lone Tree Rd. to SR 70	118	C	120	C	120	C
Pentz Rd.	SR 70 to Messilla Valley Rd.	307	C	180	C	310	C
	Malibu Dr. to De Mille Rd.	363	C	220	C	370	C
Skyway	SR 99 to Notre Dame Blvd.	2,613	D	1,670	C	3,190	**F**
	Notre Dame Blvd. to Bruce Rd.	1,915	D	910	C	2,250	D
	Bruce Rd. to Honey Run Rd.	1,725	C	350	C	1,850	C
	Honey Run Rd. to Neal Rd.	1,783	D	1,270	C	1,790	D
	Neal Rd. to Pearson Rd.	2,030	C	490	C	2,040	C
	Pearson Rd. to Bille Rd.	1,688	C	670	C	1,690	C
	Bille Rd. to Wagstaff Rd.	1,134	D	790	C	1,140	D
	Wagstaff Rd. to Clark Rd.	857	C	600	C	880	C
	Clark Rd. to Pentz Road	1,295	D	1,000	D	1,330	D
	Pentz Rd. to S. Park Road	1,430	D	1,170	D	1,450	D
	Nimshew Rd. to Shawnee Ln.	128	C	130	C	130	C
	Nimshew Rd. to Lovelock Rd.	39	C	40	C	40	C
	Lovelock Rd. to Powellton Rd.	48	C	50	C	50	C
Table Mountain Blvd.	Montgomery St. to County Center Dr.	1,134	C	1,110	C	1,290	C
	Nelson Ave. to County Center Dr.	464	C	470	C	490	C

Source: Butte County Association of Governments, Fehr & Peers, 2021.

E. Transportation Projects in Adjacent Jurisdictions

Two major transportation projects are planned in adjacent Yuba County to improve SR 70.

- **SR 70 Safety Improvement Project - Yuba County.**[3] The project will improve safety and reduce the rate of collisions along the stretch of highway in Yuba County near Marysville between Laurellen Road and the South Honcut Creek Bridge. The project includes widening and paving shoulders; providing a continuous 14-foot, two-way left-turn lane (TWLTL); a 20-foot Clear Recovery Zone (CRZ); and other safety enhancements. The project is planned to begin construction in summer of 2021 and be completed by the fall of 2022.
- **SR 70 Continuous Passing Lanes Project.**[4] The project is located along the same stretch of SR 70 in Yuba County as the Safety Improvement Project described previously (between Laurellen Road and the South Honcut Creek Bridge). The project will construct additional pavement to achieve a four-lane facility with eight-foot shoulders and a continuous TWLTL bounded by a minimum 20-foot CRZ. At County-maintained roads and certain agriculture-related businesses, the project will provide designated left-turn pockets and intersections/driveways that reflect the tractor trailer traffic associated with agricultural operations in this area. The project is planned to begin construction in summer of 2021 and be completed by the fall of 2023.

F. Transit Services and Facilities

This section describes existing and planned transit services and facilities in unincorporated Butte County.

While the automobile is the primary mode of travel in Butte County, similar to most rural areas in California, the Regional Transportation Plan, the Butte County General Plan, and the general plans of local jurisdictions support a balanced transportation system that incorporates mass transit, bicycling, walking, and other modes of travel beyond the private automobile.

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[3] Information provided by Caltrans, 2020. https://dot.ca.gov/caltrans-near-me/district-3/d3-projects/d3-sr-70-corridor-oroville-marysville.

[4] Information provided by Caltrans, 2020. https://dot.ca.gov/caltrans-near-me/district-3/d3-projects/d3-sr-70-corridor-oroville-marysville.

1. Fixed-Route Public Transit

The Butte County region transit service is primarily provided by BCAG as the owner/operator for the Butte Regional Transit (B-Line). B-Line provides both fixed route and paratransit services to Chico, Oroville, Paradise, Gridley, Biggs, and the unincorporated County. BCAG is in the process of updating the Transit and Non-Motorized Plan to develop new short-, mid-, and long-term recommendations to improve B-Line service. As documented in the RTP/SCS, recommendations for mid-term (2020 through 2027) and long-term (to 2040) time horizons include investments to speed transit and serve portions of Butte County, primarily in Chico, where transit investments will align with projected development.[5]

B-Line operates three routes for inter-city transportation between Chico, Paradise, Oroville, and the Gridley-Biggs area. One line runs between Paradise and Chico, a second between Oroville and Chico, and a third between Paradise, Oroville, and Gridley-Biggs.

Overall, the B-Line system uses 33 standard buses, with two of these vehicles powered by Compressed Natural Gas (CNG). All buses are equipped with low-floor ramps and include a wheelchair securement area with space for two wheelchairs, as well as front-mounted bicycle racks.

For inter-city travel, Route 40/41 provides eight round trips daily connecting Chico and Paradise; Route 20 provides 12 to 13 round trips daily connecting Chico and Oroville; and Route 30/31 provides three round trips daily connecting Paradise, Oroville, Gridley, and Biggs. Extended service is provided to Paradise Pines and Magalia. Transit service is operated between 5:50 a.m. and 8:00 p.m. Monday through Friday, with weekend service between 7:50 a.m. and 8:55 p.m.

There are 13 fixed routes in Chico, 9 of which connect with the B-Line inter-city routes at First and Main Streets and/or at the Highway 32 Park-n-Ride. Operating hours are 5:50 a.m. to 10:00 p.m. Monday through Friday, and 6:25 a.m. to 9:45 p.m. on Saturday. No Sunday service is provided. Eleven primary routes operate year-round, while the two student shuttle routes are limited to when California State University, Chico (CSUC) is in session.

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[5] BCAG 2020 RTP/SCS. Chapter 7 – Transit. http://www.bcag.org/documents/planning/RTP%20SCS/2020%20RTP%20SCS/Document%20Chapters/7R%20-%202020%20RTP%20ACTION%20-%20Transit.pdf

B-Line operates three 30-passenger vans in Oroville on four routes serving the City of Oroville, the County Administrative Complex, and the downtown transit center. While service is primarily within the Oroville City limits, a portion of Thermalito and South Oroville are also served. Operating hours are from 6:15 a.m. to 7:30 p.m. Monday through Friday, except for major holidays.

There is a range of fares based on type of service, with local routes priced lower than regional routes. Fares are $2.40 for regional travel, while travel within a city is $1.75. Discounted fares are available for seniors (age 65 and over), disabled people, and those with a valid Medicare card; discounted fares are $1.20 for regional travel and $0.85 for local travel. Youth (ages 6-18) ride for $1.75 for regional service and $1.25 for local service, and children under the age of 6 ride free. Monthly passes are available for $57.50 for regional service ($30.00 for discount) and $43.50 for local service ($21.50 for discount). Monthly passes are also available for youths for $40.00 for regional travel and $31.25 for local travel. Ten and two-ride passes are also available. CSUC students ride the B-Line for free based on a program funded by the Associated Students and the University. There are special rates for Butte College students and faculty, downtown Chico employees, and Butte County employees.

B-Line Transit had been in steady decline since 2015, culminating in a dramatic reduction as a result of the Camp Fire and COVID-19 pandemic. Total ridership fell by 41 percent over the five-year period of 2015 to 2020. While national ridership has been trending downward, the sharp decline in fiscal year (FY) 2018/19 of about 75,000 riders was exacerbated by an additional reduction of 75,000 riders in FY 2019/20.

In April 2015, BCAG adopted a new Transit and Non-Motorized Transportation Plan for the region. The purpose of the plan was to enhance transit, bike, and pedestrian modes included in the 2016 RTP/SCS. As documented in the 2020 RTP/SCS, long-term transit needs in the Town of Paradise are dependent on rebuilding after the Camp Fire. BCAG is currently preparing the Post-Camp Fire Regional Population & Transportation Study,[6] which will support long-term transit planning efforts through updated estimates and forecasts of the regional population, housing, employment, and traffic data for pre-, post-, and future time periods. Additionally, a coordinated update of the 2015 Transit and Non-Motorized Plan will be completed with the collected data.

[6] Information available at: https://postcampfirestudy.com/.

As noted, B-Line operations were severely disrupted by the Camp Fire and the COVID-19 pandemic, which depressed passenger ridership, fares, and service hours. While the long-term impacts of COVID-19 remain to be seen, it is likely that the long-term effects of rebuilding after the Camp Fire will have a more lasting impact on transit planning. In response to these significant changes, BCAG will prepare the B-Line Routing Study to develop short, mid-, and long-term recommendations.

Glenn County (Glenn Ride) provides eight trips per day between Willows and Chico on weekdays and three trips per day on Saturdays. There is no service on Sundays.

2. Demand Responsive Transportation

The transportation needs of the elderly and persons with disabilities are addressed by demand responsive systems in the local urban areas. These services are available from transit providers in Paradise, Chico, Oroville, and Gridley and generally consist of automobiles and/or wheelchair lift-equipped vans available on an on-call basis. A number of social service agencies also provide demand-responsive transit to their clients. [7]

B-Line Paratransit provides a door-to-door service for qualified individuals traveling within Chico, Oroville, and Paradise. The Gridley Golden Feather Flyer provides paratransit service in Gridley. B-Line Paratransit provides two types of service:

- ADA service for qualified individuals who cannot use the fixed-route system.
- Dial-a-Ride service for use by seniors 70 years of age or older.

Service is offered from 5:50 a.m. to 10 p.m. on weekdays, 7 a.m. to 10 p.m. on Saturdays, and from 7:50 a.m. to 6 p.m. on Sundays. While B-Line Paratransit service is available to all destinations within a 0.75-mile buffer of any B-Line fixed route, supplemental service to areas of up to 3 miles outside the ADA boundaries is available at an additional cost; however, in order for service to be provided to supplemental areas, there must be a direct, easily accessible route from the core service area to the proposed destination. Trips provided outside the core service area are provided when there is sufficient time and space available. Reservations may be made from one to seven days in advance. B-Line Paratransit also accommodates a limited number of same-day requests based on available capacity.

[7] All information is from the 2020 RTP/SCS, BCAG.

Butte County hosts a network of social service agencies that provide specialized transportation to their clients. The largest of these is the Work Training Center (WTC), which operates 24 vehicles transporting clients throughout Butte County. Vehicle capacities vary from 8 to 18 passengers. All but two are wheelchair accessible. Service for the WTC is funded by the Far Northern Regional Center.

3. Private Bus Operators

Greyhound Lines is a private common carrier that provides scheduled service to the Butte County region. The main Greyhound bus terminal is located in downtown Chico at the Amtrak station. The station is served by Chico Area Transit. Greyhound offers service from Chico daily and also serves Paradise, Oroville, and Gridley as well as destinations outside the Butte County region.

North Valley Shuttle provides service between Chico, Paradise, and Oroville and the Sacramento International Airport.

G. Pedestrian and Bicycle Facilities

The unincorporated areas of Butte County have existing and planned pedestrian and bicycle facilities located in both rural and urban environments. For the most part, the urban environments within the County's jurisdiction lie within the greater Chico and Oroville urban areas where the County's existing and planned pedestrian and bicycle facilities interface with the various facilities of those communities.

As mentioned previously, the adopted BCAG Transit and Non-Motorized Plan has a focus on improving the transportation network for people who walk, bike, or take transit in Butte County with recommendations for short-term and long-term changes that are within the projected financial constraints of the region. The plan includes a preferred transit route network and identifies high-priority projects to facilitate bicycling and improved pedestrian access to major transit facilities.

1. Pedestrian Facilities

The majority of the pedestrian facilities located within the urban areas of unincorporated Butte County consist of sidewalk facilities, which were constructed in conjunction with site improvements for subdivisions and commercial development. Newer sidewalk facilities include access ramps that meet both County and ADA standards, while older facilities are being gradually upgraded to include access ramps as part of the County's Capital Improvement Program. To create uniform pedestrian corridors, sidewalk improvements should be considered where feasible to complete existing facilities that presently terminate without accessible ramps or connections to adjacent facilities.

The Butte County Public Works Department has set up the following criteria for the improvement of sidewalks within County's jurisdiction:

- ♦ Provide access ramps and complete sidewalk improvements in areas, which are adjacent to or provide routes to schools.
- ♦ Construct minimum 25-foot radius curb returns at intersections and County standard access ramps in urban areas where sidewalks already exist.
- ♦ Continue sidewalks to interconnect with those already existing to create uniform pedestrian corridors in the unincorporated urban areas of the County.

Butte County's Improvement Standards typically require proposed residential and commercial developments located in the county's urban areas to construct gutters, sidewalks or walkways, public roads, proper access from public roads, and drainage facilities fronting development. Elsewhere, sidewalks are presently constructed to County Public Works Standards with a 4-foot-wide sidewalk in residential areas and a 5-foot-wide sidewalk within commercial areas, dependent on the presence of a neighborhood plan. Residential developments located within the Chico urban area that have lot sizes greater than 1 acre come under a separate rural standard that presently does not require curbs, gutters, and sidewalks.

2. Bicycle Facilities

Since Butte County has a mild climate, bicycling is popular for both transportation and recreation.

In 2011, the County adopted the Butte County Bicycle Plan, which was prepared by Butte County Public Works. This plan was developed to encourage use of bicycling in the county's unincorporated areas by connecting local communities, parks, and other recreational areas with bicycle facilities. At the time of the development of the 2011 County Bicycle Plan, each of the five incorporated municipalities in Butte County had their own bicycle master plans.

Butte County Public Works specifications and the County Bicycle Plan identify three different classifications of bicycle facilities, which are consistent with Caltrans specifications:

- **Class I Bike Paths** are bikeway facilities designated for exclusive use by both bicycles and pedestrians, which are separated from, but usually adjacent to, roadways. They are usually designed for two-way travel with an 8-foot minimum width of asphalt concrete pavement and 2-foot-wide graded aggregate base shoulders wherever practical.

- **Class II Bike Lanes** usually consist of adjacent one-way lanes on either side of the roadway that provide for the exclusive and semi-exclusive use of bicycles within the road travel way. Class II bike lane facilities require a minimum 4-foot-wide lanes on both sides of the roadway where shoulders are present and minimum 5-foot-wide lanes where curb and gutters are present. These facilities are for the exclusive use of bicycles where they are separated from the motor vehicle lane by a six-inch painted white stripe and designated with signs and permanent pavement markings. Shared use by motor vehicles within these facilities is only permissible where indicated by broken or dashed striping.

- **Class III Bike Routes** may be located on roadway facilities with sufficient width for shared motor vehicle and bicycle usage and are usually only designated by signs or permanent pavement markings indicating the route.

Class IV Bikeways are not in the Butte County Public Works specifications or the County Bicycle Plan, but were introduced by the Protected Bikeways Act of 2014 (Assembly Bill 1193 -Ting, Chapter 495), which established Class IV Bikeways for California and required Caltrans, in cooperation with local agencies and in consultation with the existing Caltrans advisory committee dedicated to improving access for persons with disabilities, to establish design criteria for separated bikeways.[8] A Class IV Bikeway (separated bikeway) is a bikeway for the exclusive use of bicycles and includes a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.[9]

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[8] Design Information Bulletin Number 89-01 CLASS IV BIKEWAY GUIDANCE (Separated Bikeways / Cycle Tracks. 2018. https://dot.ca.gov/-/media/dot-media/programs/design/documents/dib-89-01_kf-a11y.pdf

[9] Design Information Bulletin Number 89-01 CLASS IV BIKEWAY GUIDANCE (Separated Bikeways / Cycle Tracks. 2018. https://dot.ca.gov/-/media/dot-media/programs/design/documents/dib-89-01_kf-a11y.pdf

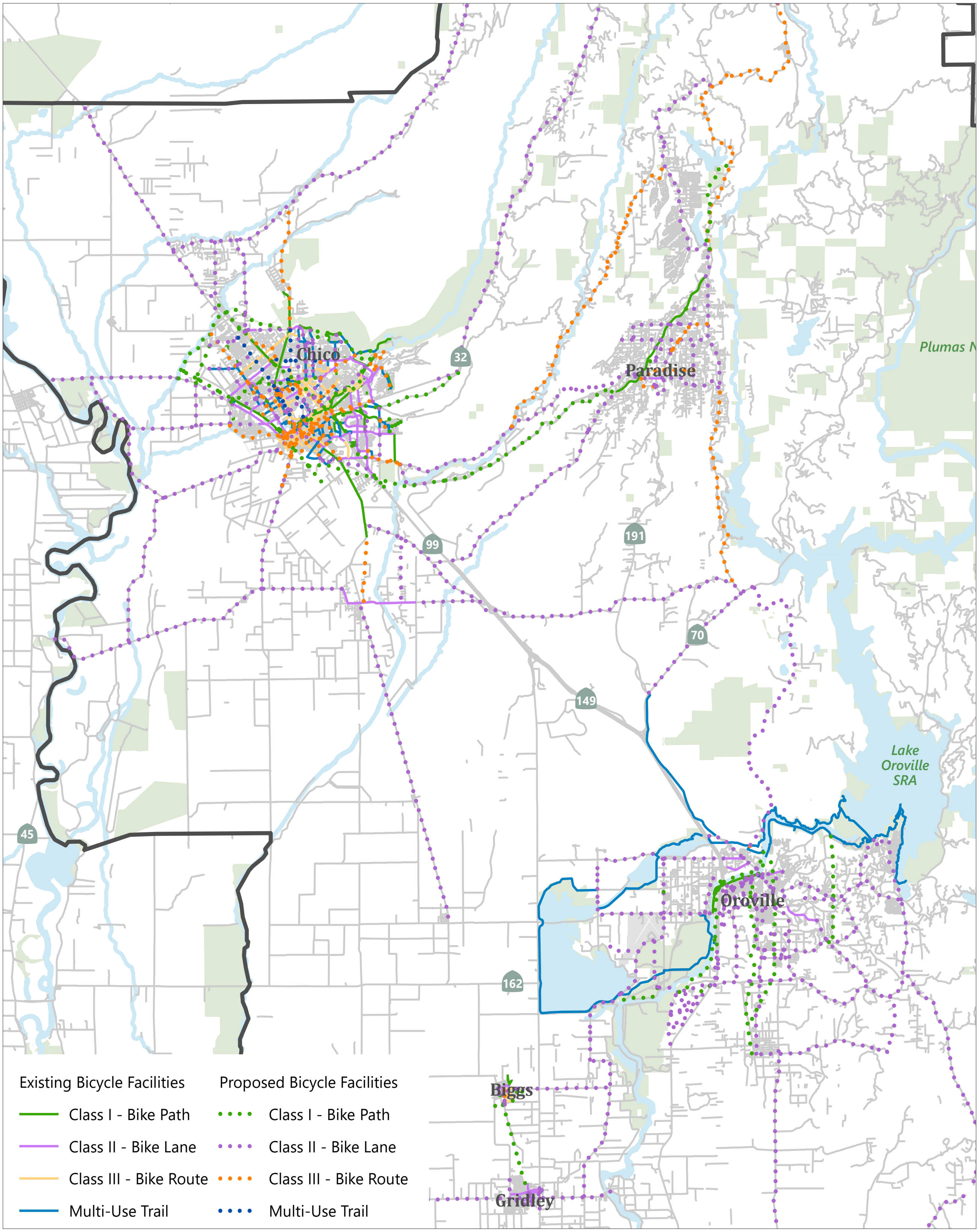
Existing and planned bicycle facilities in the County are described herein.[10]

In the Chico urban area, the County currently has multiple existing Class I bike paths, including on the easterly side of the Midway extending from the Chico City Limits on Fair Street south to Jones Avenue. Additionally, Class I bicycle paths are present alongside or parallel to several major arterial streets, including Nord Avenue, Cohasset Road, SR 99, Park Avenue and Midway, and Bruce Road. There are also multiple bike paths along waterways and abandoned railroads. Bidwell Park includes several bike paths that connect other bicycle facilities north and south of the park. There are also existing Class II bike lanes and Class III bike routes that connect with facilities located within Chico city limits jurisdiction and continue within the County's jurisdiction.

In the greater Oroville area, there is one bike path along the banks of the Feather River connecting Riverbend Park and SR 70. In the Durham Area, an existing Class II bike lane facility runs south from Chico along Midway to Jones Avenue in Durham. Several multi-use trails serve the area north and west of Oroville, continuing north along SR 149 to the Butte College campus on Clark Road. For the remaining portions of the county, existing urban bikeway facilities typically fall under the jurisdictions of the Cities of Biggs and Gridley or the Town of Paradise.

The County's bikeway facilities in the unincorporated areas of Butte County are typically planned to interface with facilities planned by BCAG and the local jurisdictions. As shown in Figure 5-4, these include planned bikeway facilities along River Road, Chico River Road, and Old Humboldt Road in the Chico area. Bikeway facilities are also planned along Skyway, Neal Road, Pentz Road, and Midway to connect Chico with Paradise and Durham. County bikeway facilities are also planned along Table Mountain Boulevard, Larkin Road, Gridley-Colusa Highway, Olive Highway, and Miners Ranch Road, among other corridors.

[10]All information is from the BCAG Transit and Non-Motorized Plan (2015) and BCAG 2020 RTP/SCS.



Source: Butte County Association of Governments, 2020.

Figure 5-4
Existing and Planned Bicycle Facilities

H. Rail Facilities and Services

Union Pacific maintains a total of 100.4 miles of mainline track, with two mainlines, one in the western portion of Butte County (formerly the Southern Pacific mainline), and one in the eastern portion of the county. Numerous sidings are located in and around Oroville as well as further north along the Feather River. These sidings provide transportation services to a number of manufacturing industries, lumber mills, quarries, and agricultural producers.

Passenger service is offered by AMTRAK in one location in Butte County. The Coast Starlight train is the most popular long-distance train in the Amtrak system. It runs between Los Angeles and Seattle via Oakland and Sacramento. The northbound train stops in Chico at 1:55 a.m. and the southbound train stops there at 3:50 a.m.

Other train service is available from stations outside of Butte County via feeder bus service to the county. The California Zephyr runs from San Francisco to Chicago and provides local service in the San Francisco-Sacramento-Reno corridor. The Capitol Corridor rail service provides commuter inter-city service between Sacramento/Roseville and San Jose. The San Joaquin train runs from the Bay Area to Los Angeles via the Central Valley. AMTRAK operates a bus service for the northern Sacramento Valley that connects Chico and Oroville to the California Zephyr and Capitol Corridor services at Sacramento and to the San Joaquin rail service at Stockton. Feeder bus connections for intercity rail service are available more widely in Butte County. Four buses each northbound and southbound stop at Chico and Oroville to connect with the Capitol Corridor rail service and with the San Joaquin route between Oakland and Bakersfield. Subsequent bus connections from these routes allow travel to Reno, Yosemite, Las Vegas, Monterey, and throughout the Los Angeles, San Diego, and San Francisco Bay urban areas.

Caltrans completed the California State Rail Plan 2007/08–2017/18, which identified potential new intercity rail services, including the Sacramento to Redding Corridor. In addition, the *North Valley Rail Vision* plans to study the extension of San Joaquin passenger rail service to Oroville, as well as merging the daily AMTRAK San Joaquin's thruway bus service with a proposed Chico to Sacramento daily commuter bus service. These strategies are intended to address the *North Valley Rail Vision* goals, which include:

- Reduced greenhouse gas emissions
- Increased multi-modal connectivity for north state counties

- ♦ Reduced VMT and expanded ridership
- ♦ Improved public health
- ♦ Benefits to disadvantaged communities in Butte and Yuba Counties
- ♦ Improved safety for evacuation corridors

Butte County will continue to monitor intercity rail expansion, needed grade separation projects, and regional collaboration on the High-Speed Rail System in California as it relates to Butte County.

I. Air Transportation

Air transportation in Butte County is served by a number of private and public airfields and heliports serving general aviation and agricultural users. Most of these are small air facilities for private use. Commercial flights to distant or out-of-state destinations are available at the Sacramento International Airport, about 60 miles south of Oroville.

On November 15, 2017, Butte County's Airport Land Use Commission (ALUC) adopted the current Butte County Airport Land Use Compatibility Plan (ALUCP). This plan served as an update to the 2000 ALUCP. As described in the plan, the purpose of this document is to promote compatibility between the airports in Butte County and the land uses that surround them. It establishes procedures and criteria for the ALUC to review proposed land use development and affected cities within the county for compatibility with airport activity. State law requires public access airports to develop Comprehensive Land Use Plans (CLUPs), designating airport vicinity land use and clear zones. Such plans are to be adopted by the County's ALUC, which consists of representatives as follows: two city, two airport managers, two County Supervisors and one member from the public at large.

The Butte County ALUCP is distinct from individual airport master plans, which address planning issues for a specific airport. The purpose of a compatibility plan is to assure that incompatible development does not occur on lands surrounding the airport.

The 2017 ALUCP encompasses the Chico Municipal Airport, the Oroville Municipal Airport, the privately owned Paradise Skypark Airport, and the privately owned Ranchaero Airport. These four airports are the principal facilities in Butte County and are further described below. The locations of these airports are shown on Figure 5-1.

Each of the major aviation facilities in Butte County is described herein.

1. Chico Municipal Airport

The Chico Municipal Airport is the largest and busiest airport in Butte County. It is owned and operated by the City of Chico. The airport is located to the north of the city, west of Cohasset Road. Over the past 50 years, urban expansion has extended towards the airport.

Current facilities accommodate business enterprise, repair service, small package or courier service, agricultural activities, medical emergency, search and rescue, pilot training, and recreational and tourism activities.[11]

The City of Chico adopted the Chico Municipal Airport Master Plan in 2003. The plan is a comprehensive review of existing and projected facilities and infrastructure on the airport properties as well as future traffic demands and use patterns for the airport extending into the future. In 2014, commercial service was discontinued at Chico Municipal Airport, but in 2020, the City of Chico was awarded a Federal Aviation Administration (FAA) grant to assist with restarting commercial service. This was made possible by a 2018 amendment to the FAA reauthorization that removed a rule that kept the airport from getting commercial air grants.

The majority of takeoffs and landings are private general aviation aircraft, California Department of Forestry and US Forest Service aircraft, corporate charter flights, and medical deliveries.

Chico Municipal Airport has two paved runways and a control tower. A 20-year airport master plan has been put into place to plan improvements that will expand passenger and cargo operations. The Airport Layout Plan (2009) identified a proposal to extend both runways: a nearly 2,000-foot northward addition to the primary runway for a total length of 8,600 feet and a doubling of the parallel runway to 6,000 feet in length.

[11] Butte County 2020 RTP/SCS.

Although the City of Chico developed an Airport Master Plan in 2003, much of the information and planning is based on commercial service and is no longer relevant. The 2017 Butte County Airport Land Use Compatibility Plan provides a compatibility map of the Chico Municipal Airport and its environs.

2. Oroville Municipal Airport

The Oroville Airport is owned and operated by the City of Oroville. Today, the airport occupies 877 acres and is located 2.5 miles west of the city along SR 162. Although the city's sphere of influence extends a mile west of the airport, only the airport property and some private land to the north and west are within the city boundary. The surrounding unincorporated county area includes the community of Thermalito situated northeast of the airport.

To the southwest and southeast lie State-owned water project and wildlife refuge lands. The airport has two paved runways.

In 2019, this airport served 40,000 operations, half of which was accounted by itinerant aviation traffic. There are 70 based aircraft at the airport.

In 2000, the City of Oroville amended its General Plan and Zoning regulations to be consistent with the Butte County Airport Land Use Compatibility Plan. These changes created an Airport Influence Area in order to make growth of the airport compatible with land use surrounding the airport. A map of this Airport Influence Area is in the 2017 Butte County Airport Land Use Compatibility Plan. The *2030 Oroville General Plan* includes strategies to annex unincorporated areas within the City's sphere of influence, including Oro Bay and Rio d'Oro, which are within the Airport Influence Area.

3. Paradise Skypark Airport

The Paradise Skypark Airport is located 3 miles south of the Paradise town center. It is privately owned and operated and has one runway extending 3,100 feet. It is an important regional base for skydiving activities. As of July 2017, there were a total of 38 based aircraft and an average of 41 operations a day (approximately 15,000 annual operations).[12]

[12] Federal Aviation Administration Airport Master Record and AirNav.com (July 2017).

The 2017 Butte County Airport Land Use Compatibility Plan provides a compatibility map of the Paradise Skypark Airport and its environs.

4. Ranchaero Airport

The Ranchaero Airport is a 23-acre facility located on the west side of Chico. Privately owned and operated, it has one runway of 2,160 feet. Flight instruction makes up a large portion of its daily operations. Ranchaero Airport is 23 acres in size and is defined as a general aviation airport. As of 2017, the airport handled 5,000 aircraft operations per year with 34 based aircraft. [13]

No master plan has been prepared for the Ranchaero Airport. However, the 2017 Butte County Airport Land Use Compatibility Plan provides a Compatibility Policy Map of the Ranchaero Airport and its environs.

5. Additional Air Traffic Facilities

There are multiple air traffic facilities throughout Butte County. Lake Oroville Seaplane Landing Site provides seaplane landing access for pilots that adhere to federal and other associated guidelines. A State permit was revoked from this location in 2012.

There is one heliport in Oroville at the Butte County Sherriff's Office jail complex, one located at Enloe Hospital in Chico, and one located at Oroville Hospital in Oroville.

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[13] Federal Aviation Administration Airport Master Record and AirNav.com (July 2017).

6 WASTEWATER, STORMWATER, AND SOLID WASTE

This chapter focuses on wastewater, stormwater, and solid waste facilities and services in Butte County. Other major public utilities and facilities are discussed elsewhere in the chapter: gas and electrical utilities are described in Chapter 14, Energy, and water supply systems in Chapter 12, Water Resources.

Wastewater disposal in unincorporated Butte County is not provided by a single public utility or agency but occurs through a variety of service districts and community systems. In most of the unincorporated county, wastewater disposal occurs through individual private on-site septic systems. These systems have become of increasing concern in recent years and have been the subject of considerable study and development of new regulations.

In addition, the chapter describes solid waste collection and disposal facilities in the County, including issues concerning the County's Neal Road Landfill, as well as compliance with State of California mandates regarding solid waste reduction.

I. WASTEWATER

This section describes the regulatory setting and existing conditions regarding the various methods by which wastewater disposal occurs in Butte County. As previously noted, these fall into two main categories: individual on-site wastewater disposal systems, also commonly termed septic systems, and community wastewater systems, which offer centralized collection and treatment facilities serving multiple individual users.

A. Regulatory Setting

In California, all wastewater treatment and disposal systems fall under the overall regulatory authority of the State Water Resources Control Board (SWRCB) and the nine California Regional Water Quality Control Boards (RWQCBs), who are charged with the responsibility of protecting beneficial uses of State waters (ground and surface) from a variety of waste discharges, including wastewater from individual and municipal systems. Butte County falls within the jurisdiction of the Central Valley RWQCB.

The RWQCB's regulatory role often involves the formation and implementation of basic water protection policies. These are reflected in the individual RWQCB's Basin Plans, generally in the form of objectives, guidelines, criteria, and/or prohibitions related to the siting, design, construction, and maintenance of on-site sewage disposal systems. The SWRCB's role has historically been one of providing overall policy direction, organizational and technical assistance, and a communications link to the State legislature.

The RWQCBs may waive or delegate regulatory authority for on-site sewage disposal systems to counties, cities, or special districts. This is not mandatory; however, it is commonly done and has proven to be administratively efficient. In some cases, this is accomplished through a Memorandum of Understanding (MOU), whereby the local agency commits to enforcing the Basin Plan objectives or other specified standards that may be more restrictive. The RWQCBs generally elect to retain permitting authority over large and/or commercial or industrial on-site wastewater disposal systems, depending on the volume and character of the wastewater. The established protocol for involvement of the RWQCB in permitting and review is established by a routine understanding between the County and the RWQCB. Table 6-1 provides a summary matrix of review and oversight authority for RWQCB and the County for new development projects requiring sewage system reviews.

1. Community System Regulations

The RWQCB has direct oversight and permitting responsibility for large-flow systems of greater than 2,500 gallons per day (gpd) and community systems, unless the Board chooses to waive that authority and delegate their oversight to the Department of Public Health, Environmental Health Division on a case-by-case basis. Some community systems in Butte County fall within County Service Areas (CSAs), which have assumed responsibility for oversight and/or maintenance of the infrastructure. In these cases, the CSA is considered the responsible party (discharger) under terms of the permit issued by the RWQCB.

TABLE 6-1 RWQCB AND COUNTY REVIEW CRITERIA FOR NEW DEVELOPMENT PROJECTS

Location	Project Type	RWQCB Review
Butte County	0-4 Residential (new parcels)	County Review only for installation/construction
	5-15 Residential (new parcels)	Inform RWQCB of project (copy of data to RWQCB)
	16+ Residential (new parcels)	Approval of RWQCB Staff or Board Required
	0-2,500 gal. Commercial <6 residential unit equivalent	County Review only for installation/construction
	2,500+ gal. Commercial 6+ residential unit equivalent	Approval of RWQCB Staff or Board Required
	Two or more separate parcels residential or commercial that share sewage disposal	Approval of RWQCB Staff or Board Required
Chico Urban Area Paradise Adjacent High Nitrate Areas Watershed Protection Zones	0-4 Residential (new parcels), meeting Prohibition Order Requirements	Project Notification. Soil data and water quality not provided unless requested
	5+ Residential and all residential in Chico Urban Area under 1 acre/dwelling unit equivalent lot size	Approval of RWQCB Staff or Board Required
	0-1,000 gal. Commercial	County Review only for installation/construction
	1,000+ gal. Commercial	Approval of RWQCB Staff or Board Required
Durham (Developed Community Area)	Any development in excess of 1,000 gal./acre/day	Approval of RWQCB Staff or Board Required

Note: The above routing is for routine project reviews. Special circumstances may require additional Regional Water Quality Control Board approval.
Source: Butte County Environmental Health, 2021.

2. Individual On-site Sewage Disposal System Regulations

Regulation of individual on-site sewage disposal systems in unincorporated Butte County occurs at a variety of levels, including by the SWRCB through the Central Valley RWQCB, and locally, by the County. The State of California has enacted legislation that requires the establishment of statewide standards for on-site sewage disposal systems (Assembly Bill [AB] 885).

Counties typically regulate septic systems via their environmental health and/or building or planning departments. In Butte County, septic systems are regulated by the Public Health Department. Local septic system ordinances often incorporate portions of the Uniform Plumbing Code and other specific requirements. On June 24, 2016, the Central Valley RWQCB adopted Resolution R5-2016-0044 approving the Local Agency Management Program (LAMP) for Butte County Environmental Health Division regulating on-site wastewater systems within the County.

The following sections describe the primary regulatory mechanisms in place for on-site sewage disposal systems. AB 885, a significant piece of adopted legislation, has affected regulation of on-site sewage disposal systems.

a. Regional Water Quality Control Board Basin Plan for the Central Valley

The Central Valley RWQCB has adopted policies and requirements pertaining to on-site sewage disposal systems, commonly referred to as the Basin Plan.[1]

The on-site sewage disposal systems element of the Basin Plan sets forth various objectives, guidelines, general principles, and recommendations for the use of on-site sewage disposal systems that cover a variety of topics. Mandatory requirements for the siting and design of on-site sewage disposal systems are reflected in the Basin Plan. Included for all on-site sewage disposal systems are specific criteria related to separation distances to groundwater, setbacks to water features, soil conditions, percolation rates, special design systems, and leachfield replacement area. Further discussion of these criteria is provided later in this section.

b. Assembly Bill 885

AB 885 was passed by the California Legislature in September 2000 and mandates the establishment of statewide standards to regulate the placement and use of on-site wastewater treatment systems (OWTS). AB 885 requires each regional board to incorporate the SWRCB's regulations or standards into the appropriate regional water quality control plans. Butte County follows the rules and regulations of the SWRCB as a part of the Central Valley RWQCB through the region's Basin Plan. AB 885 creates a uniform policy for the County to follow in accordance with the SWRCB. As a result of AB 885, Butte County has adopted, and the Central Valley RWQCB has approved, the Butte County LAMP that addresses aspects of the placement and use of OWTS, including:

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[1] A copy of the Basin Plan can be obtained at the RWQCB website at http://www.swrcb.ca.gov/rwqcb5/available_documents/basin_plans, or at their offices in Redding, Sacramento, or Fresno.

- Site evaluation practices
- Operation and maintenance manuals
- Septic tank risers and effluent filters
- Supplemental treatment systems
- Dispersal system siting and design criteria
- Protection of impaired waters
- Groundwater quality and septic tank monitoring
- Record keeping
- Groundwater level monitoring

c. Butte County Regulations

On-site wastewater systems in Butte County within the parameters of Table 6-1 fall under the local jurisdictional authority of the Butte County Public Health Department, Environmental Health Division, except for the Town of Paradise, where on-site sewage disposal systems have been regulated by the Town since 1992 with the formation of the Paradise On-Site Wastewater Management Zone. On-site sewage disposal systems located within the incorporated areas of Chico and Oroville are regulated by the County under agreements with these cities. The County and the Town of Paradise are required to conduct their local regulatory programs in accordance with the RWQCB Basin Plan Guidelines and related requirements identified by specific written agreements.

i. Butte County Local Agency Management Program and On-Site Wastewater Manual

Last updated in 2016, the Butte County LAMP created an On-Site Wastewater Manual.[2] The manual implements the requirements of AB 885 and is divided into five main parts addressing the following topics: Process, Materials, System Requirements, Operation-Monitoring-Maintenance, and Environmental Monitoring and Reporting. This On-Site Wastewater Manual is the primary document for Butte County concerning requirements and regulations for OWTS.

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[2] Butte County LAMP, 2016 (http://www.buttecounty.net/Portals/21/Env_Health/Wastewater/BCLAMPManual.pdf?ver=2020-05-01-121027-403). Accessed February 2021.

ii. Butte County Code Chapter 19: On-Site Wastewater Systems

Butte County regulations for on-site sewage disposal systems are a compendium of several documents and ordinances. The framework for Butte County permitting is contained in Chapter 19 (On-Site Wastewater Systems) of the Butte County Code. Chapter 19 establishes the requirements for sewage disposal within the County addressing a variety of aspects including documentation of unlawful disposal methods, general permit requirements, and establishment of temporary conditions, as well as exceptions. The chapter also specifies septic system setbacks, and provides reference to other regulations, contained in Section 10 of Chapter 19 for subdivision requirements. "Chico Urban Area Nitrate Compliance Plan" guidelines are also mentioned in Section 11 of Chapter 19 in the Butte County Code.

Supplementing the Chapter 19 framework is a series of policies, documents, and inter-office memoranda establishing design and construction requirements for septic systems. These requirements include bedroom definition specifications, disposal field sizing, siting and design requirements, septic tank sizing, inspection requirements, and materials requirements.

iii. Butte County Code Chapter 19, Section 10: Minimum Requirements for Creation of All New Parcels and for Existing Parcels within a Watershed Protection Overlay Zone

Section 10, which was revised on April 12, 2016, supplements the County regulations in Chapter 19 by establishing requirements for new subdivisions. Section 10 presents these requirements by a matrix relating minimum usable land areas, percolation rates, and soil depth for subdivisions where septic tanks and drainfields are to be used. For a subdivision to be approved, each proposed lot must have a minimum useable wastewater system area. The usable area is defined based on a series of exclusions that consider areas within the lot, such as:

- Wastewater system setbacks to buildings, as specified in the On-Site Wastewater Manual.
- Wastewater system setbacks to wells, streams, springs, drainage courses, cut or fill banks, lakes or reservoirs, and lot lines adjacent to properties that use wells when well is not yet installed or unspecified on plan.
- Easements dedicated or reserved for surface or underground improvements unless dedicated or reserved for sewage disposal purposes.
- Easements for access for roadway purposes.
- Areas within 5 feet of existing structures (for new lots without structures, 2,500 square feet is assumed for building size).

- Areas within 5 feet of the property line.
- Paved areas.
- Areas with slopes more than 30 percent.
- Areas where the percolation rate is slower than 120 minute per inch (mpi) or faster than 1 mpi.
- Vertical separation requirements in Chapter 19-10, subsection B.

In addition to the minimum lot size requirements, sewage disposal areas must be such that it is practicable to use them as disposal areas in accordance with standard practices. The minimum parcel size requirements are discussed in further detail and listed in Table 2 of Chapter 19, Section 10, of the Butte County Code.

iv. Butte County Code, Chapter 19B: Wastewater Ponds Ordinance

In 2014, the Butte County Code was amended to include Chapter 19B (Recycled Water [Wastewater] Pond Ordinance), which establishes that wastewater ponds shall be allowed for the following purposes:

(a) Protect and enhance public health through the establishment of sound technical and regulatory requirements governing the application of recycled water ponds used solely for the purpose of holding recycled water, as described herein.

(b) Provide a safe alternative for the management of recycled water for parcels where leach fields cannot function on a year-round basis due to site constraints.

(c) Ensure the ongoing and adequate operation, maintenance, and monitoring of sewage systems using recycled water ponds.

(d) Promote the use of sustainable wastewater collection, treatment, and dispersal systems that use recycled water.

Applicability, regulations, and restrictions can be found in Chapter 19B of the Butte County Municipal Code.[3]

[3] Chapter 19B: Recycled Water (Wastewater) Pond Ordinance. https://library.municode.com/ca/butte_county/codes/code_of_ordinances?nodeId=CH19BREWAWAPOOR. Accessed January 2021.

v. Nitrate Compliance Plan (RWQCB Order No. 90-126)

In the 1980s, the RWQCB recognized that on-site sewage disposal systems were contributing to elevated nitrate levels in groundwater in the Chico area. In response, the RWQCB initially issued a Prohibition Order requiring all existing septic systems in the Chico Urban Area to convert to community sewer system. The County, working with the City of Chico and the RWQCB, developed strict standards limiting any new systems, the creation of an On-Site District, and a plan to finance the conversion of thousands of existing septic systems to the City sewer system.

The Nitrate Compliance Plan, adopted by the Board of Supervisors on September 25, 2001, supersedes the previous Nitrate Action Plan, and enacts strict standards for density requirements for new septic systems. The standards, as established in the Nitrate Compliance Plan, allow for conventional septic systems only in narrowly defined circumstances. The plan calls for the elimination of existing systems in most of the Chico Urban Area and identifies a financing mechanism to do this. The plan also provides for case-by-case evaluation of non-residential septic systems and recognizes that sewer connection may not be practical or feasible in all cases.

The standards established by the Nitrate Compliance Plan allow for the use of conventional systems comprised of standard septic tanks with conventional leach fields. These standards are more restrictive than those imposed for existing parcels in other areas of the County and include specific provisions intended to reduce the overall density of wastewater discharges to mitigate cumulative nitrate loading impacts.

vi. Butte County Code, Chapter 24 Section 34.1: Butte Creek Canyon Overlay Zone

The Butte Creek Canyon Overlay Zone establishes policies, procedures, and standards for Butte Creek Canyon, a significant scenic and ecological resource for the County. It includes restrictions on land use and development, sewage disposal, and erosion control to protect the water quality and scenic value of Butte Creek Canyon while allowing recreational and residential uses.

vii. Butte County Code, Chapter 24, Section 46: Watershed Protection Overlay Zone

The Watershed Protection Overlay Zone, amended as recently as 2021, establishes policies, procedures, and standards for the Paradise Reservoir, Magalia Reservoir, and Firhaven Creek Watersheds, including limitations and restrictions on land use, sewage disposal, and erosion-control measures. The purpose of the overlay zone is to maintain and improve water quality for sensitive water resources within Butte County, including the water supply of the Town of Paradise.

The regulations establish specific restrictions and procedures, including the prohibition against the division of lots within the Firhaven Creek Watershed and changes to parcel zoning within the Watershed Protection Overlay Zone. This section of the Butte County Code broadens the effect of Chapter 19, Section 10 (Minimum requirements for creation of all new parcels and for existing parcels within a Watershed Protection Overlay Zone) to also include all development, including multifamily residential, commercial, and industrial regardless of the date the parcel was created.

B. Existing Conditions

This section describes existing conditions related to individual and community wastewater systems, and to on-site sewage disposal systems in the county.

1. Public and Community Wastewater Systems

Several urban area and smaller clusters of development in Butte County are served by community wastewater systems. Due to urban densities that are not suitable for individual systems or to take advantage of economies of scale, some communities rely on community systems for wastewater treatment and disposal. Community systems can be separated into two major categories: municipal wastewater systems and community wastewater systems.

a. Municipal Wastewater Systems

Municipal wastewater treatment plants are used to serve the sanitary sewer needs of major population areas. Typically, these systems are operated by cities or local sewerage agencies under permits issued by the RWQCB.

Municipal systems are comprised of collection, treatment, and disposal components. Wastewater collection occurs through a network of sewer mains that accept flows from the wastewater customers and is collected and conveyed through pipe infrastructure to the treatment facility. Conveyance is typically by gravity; but pumps and pressurized force mains are required to accommodate low lying properties and low points in the collection system. The treatment systems and facilities used differ based on the level of treatment required to meet discharge requirements along with cost, space available, and estimated flow. System components commonly include primary treatment (screening, grit removal, and primary separation and settling of solids), followed by a secondary treatment process for the reduction of biochemical oxygen demand, total suspended solids, and/or nutrients (nitrogen and phosphorous). Where disinfection of the final effluent is included, chlorine, ozone gas, or ultraviolet light are typically used. Where additional (tertiary) treatment is required to meet discharge or reuse requirements, biological nutrient removal for total nitrogen and phosphorus and filters (sand, disc, cloth, or membrane) are used.

Wastewater effluent disposal for municipal systems is typically by discharge to a water body, land application for agricultural or landscape irrigation, subsurface dispersal (leach fields or subsurface drip systems), or evaporation/percolation from ponds.

There are five active municipal wastewater treatment plants in Butte County, including facilities located in the Biggs, Chico, Gridley, Richvale, and Oroville areas. Information concerning the capacity, treatment, and disposal methods in use at these facilities are summarized in Table 6-2, and their locations are shown in Figure 6-1. These municipal systems are all owned and operated by governmental agencies (city or special district).

b. Community Wastewater Systems

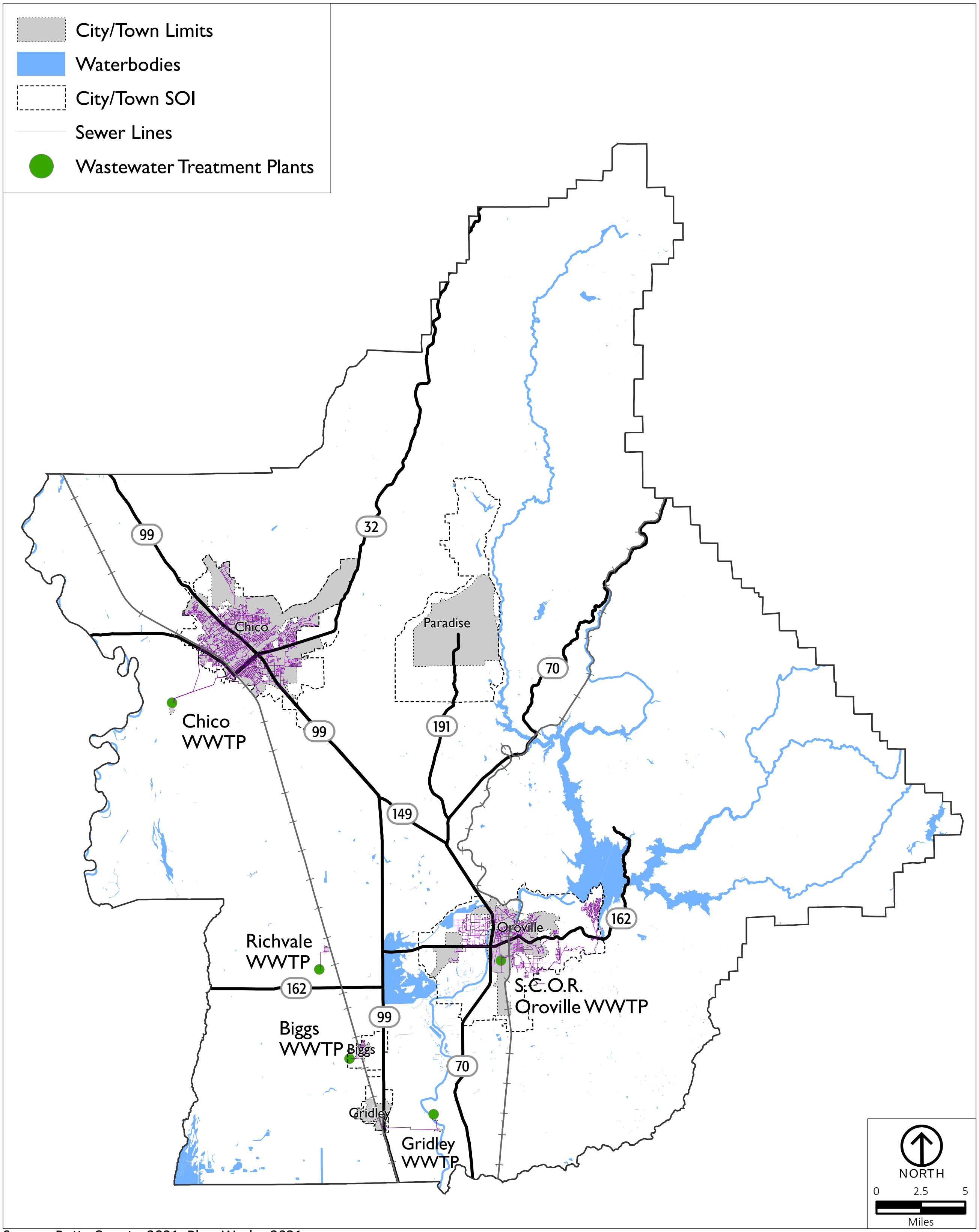
There are currently six CSAs managing non-municipal community sewerage systems in the County. Table 6-3 lists various systems currently operated under County sewerage CSAs. All these systems are regulated by the RWQCB except for one. The exception is CSA 135, Zone 4, which serves a small four-lot subdivision; the system consists of a sand filter and community leachfield. The RWQCB did not issue waste discharge requirements for this system; instead, it is regulated by the Butte County Environmental Health Division.

Community systems are comprised of wastewater treatment components serving multiple units, typically multiple residential units, or mixed-use developments. Community systems are often used for planned developments and community leach field upgrade projects (i.e., replacing a group of failed individual septic systems). Community systems have the advantage of allowing for more flexibility in site planning by condensing the area used for wastewater treatment and disposal. This may leave more land area available for open space or for other site development uses. Additionally, in cases where some lots in a development may have limiting site constraints for wastewater but are otherwise buildable, combining the wastewater system in one portion of a development area that is most amenable to wastewater treatment may allow for the development and the wastewater facilities to be better matched to the physical limitations of the site. By consolidating all or portions of the wastewater system components, there is also the potential for a higher level of treatment, greater reliability, and lower costs for operation and maintenance. However, this is contingent upon reliable operation and maintenance.

TABLE 6-2 MUNICIPAL WASTEWATER TREATMENT SYSTEMS

Community	Treatment Method	Disposal Method	Permitted Capacity (mgd)[b]	Comments
City of Biggs	Aerated Lagoons	Surface Discharge to Drainage Lateral K	0.38	History of problems with disinfection system (chlorine), inflow and infiltration in collection system, and flow measurement.
City of Chico	Activated Sludge	Surface Discharge to the Sacramento River	12.0	Expansion to 15 mgd anticipated in the future.
City of Gridley	Aerated Lagoons	Evaporation/ Percolation Ponds	1.75	
Richvale Sanitary District	Primary Settling	Evaporation Ponds	0.03	History of problems meeting waste discharge requirements.
Sewerage Commission – Oroville Region[a] (City of Oroville, Thermalito Water & Sewer District, LOAPUD)[a].	Activated Sludge & Sand Filters	Surface Discharge to the Feather River	6.5	Industrial pretreatment program approved by RWQCB in 2000; History of inflow and infiltration problems (responsibility of collection system agencies). Design of plant upgrade project underway.

[a] SC-OR provides wastewater treatment and disposal for the City of Oroville, Lake Oroville Area PUD, and Thermalito Water and Sewer District (formerly Thermalito Irrigation District) under a Joint Powers Agreement. The three member entities own and operate sewer collection systems within their individual jurisdictions.
[b] mgd = Millions of Gallons Per Day.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE X-X

WASTEWATER INFRASTRUCTURE

TABLE 6-3 EXISTING CSA WASTEWATER SYSTEMS

System Name	WDID No.[a]	RWQCB Status[b]	Parcels Served	System Description	County Environmental Health Activities
CSA 21 Zone 1 – Oakridge Sewer – Skansen	5A0401108001	3B	34	Gravity sewer system with freshwater flushing - collector piping to dosing tank to 2 ponds; semi-annual cleanout of ponds	Monthly monitoring and water testing
CSA 21 Zone 2 – Oakridge Sewer – The Bluffs at Spanish Gardens	None	None	23	Septic Tank Effluent Pumps (STEPs) to community leachfield	Quarterly monitoring
CSA 21 Zone 3 – Oakridge Sewer – The Bluffs at Spanish Gardens	None	None	3	Individual on-site septic tanks and leachfields	None required
CSA 21 Zone 4 – Oakridge Sewer – Rocky Bluffs	5A0401108001	3B	31	STEPs to dosing siphon to open-bottom sand/gravel filter; redundant system available	Quarterly monitoring with water testing
CSA 82 – Stirling City Sewer	5A040113001	2B	94	Gravity main line to two concrete storage tanks to three ponds; storage tanks constructed in 2002 - replaced redwood storage tank	Quarterly monitoring
CSA 94 – Sycamore Valley Sewer and Lighting	None	None	22	STEPS to community leachfield	Quarterly monitoring
CSA 135 Zone 2 – Keefer Creek Estates	5A041041001	3B	21	STEPs to dosing siphon to gravel filter to community leachfield; Homeowners Association administers WDRs	Quarterly monitoring
CSA 135 Zone 4 – McWilliams	5A041041001	3B	4	STEPs to open-bottom sand filters in community leachfield	Quarterly monitoring
CSA 141 – Mountain Oaks Sewer	5A040121001	2B	55	STEPs to dosing chamber to pond to irrigation system; redundant system available; Homeowners Association administers WDRs	Quarterly monitoring
CSA 169 Zone 1 – Pheasant Landing	5A041045001	3B	17	STEPs to individual sand filters to shallow percolation	Administers WDRs
CSA 169 Zone 2 – Pheasant Landing	None	None	26	STEPs to individual sand filters to shallow percolation; Homeowners Association administers WDRs; County may assume responsibility of regulation oversight and maintenance in the future, but developer continues to operate & maintain system.	Currently only fee collection

Source: CSA MSR Final Document pdf (buttelafco.org). Accessed February 2021.
[a] Stormwater Waste Discharge Identification number.
[b] RWQCB status in relation to the WDID.

2. Individual On-Site Sewage Disposal Systems

There are an estimated 53,000 on-site sewage disposal systems (i.e., septic systems) in Butte County. Roughly 20 percent of the septic systems are located within and fall under the jurisdiction of the Town of Paradise;[4] the remaining 80 percent of the systems fall under the County's jurisdiction.[5] Standard septic tank-leach field systems have historically been installed in most of the unincorporated areas of the County, with limited oversight from the County Environmental Health Division and the Central Valley RWQCB.

The Town of Paradise is in the process of designing a sewer collection system that would serve a large portion of the downtown area, decreasing the reliance on individual systems in that area. In 2017, feasibility studies were completed, funded by a grant from the SWRCB. An executive summary of phase 1 of the proposed project was released in November 2020. The proposed project would have a sewage service area (SSA) that would serve 1,469 of the 11,000 parcels in the Town. Sewer collection systems would be installed in the SSA and the wastewater conveyed west to connect to the City of Chico's wastewater collection system. The proposed project is intended to encourage the opening of new businesses and stop degradation of the local groundwater supply. A technical memorandum from November 2020 shows that the Town hopes to have the entire project finished by the year 2056.[6]

a. Siting Considerations for On-Site Sewage Disposal Systems

The following is a review of the key factors that affect the siting and functioning of on-site sewage disposal systems, including the applicable standards contained in the Basin Plan and/or Butte County regulations. These elements provide knowledge and background on why on-site wastewater systems are located where they are, and how they operate.

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[4] Susan Hartman. Community Development Director, Town of Paradise. Personal Communication. April 19, 2021.

[5] Elaine McSpadden. Director, Environmental Health Division, Butte County. Personal communication with Eli Krispi, PlaceWorks. August 18, 2020.

[6] Town of Paradise - Paradise Sewer Project Phase 1 Report. Accessed January 2021.

i. Soils

Soil suitability is the single most critical aspect of on-site sewage disposal. The soil provides the medium for the dispersal and treatment of wastewater discharged through sub-surface leach field systems. This is accomplished mainly through a combination of physical filtering, biological and chemical processes, and dilution. In order to be effective, the soil must have reasonable permeability for water movement, sufficient amount of fine soil particles (i.e., silt, clay, and fine sand) for filtering and support of biological activity, adequate depth of soil above the water table (zone of aeration) for treatment to occur, and suitable drainage to prevent saturation or flooding. Septic system failures can occur as a result of: (a) the inability of soil to absorb the wastewater at a rate that matches the flow from the house; (b) inadequate treatment due to shallow soils and/or rapid percolation to the water table; or (c) seepage along a drainage course or cut slope due to inadequate lateral setback, shallow soils, and/or poor percolation. Soil conditions can vary within short distances. Detailed investigation of the soil is generally needed to determine the septic system suitability of any given site. At a minimum, proper investigation includes a soil profile analysis to determine soil texture, structure and depth, percolation/permeability characteristics, and presence of groundwater.

The Basin Plan requires that there be a minimum of 5 feet of soil below the bottom of a leaching trench or 10 feet of soil below the bottom of a seepage pit and that the separation from groundwater be 5 feet for leaching trenches and 10 feet for seepage pits.

Excavation of soil pits are typically not required for issuance of construction permits for on-site wastewater systems on existing parcels within the County. Staff utilizes soil classification maps for determining soil type for existing parcels and, in some cases may road cuts, or neighboring site information to further assess soil conditions. If there are no available data, the data is inconclusive, or there is a contention, then staff will require usually require excavation of soil pits.

ii. Geology

The geology of an area is important to the suitability and performance of on-site sewage disposal systems due to its influence on topography and landforms, the type and characteristics of soils that develop at the surface, the occurrence and movement of sub-surface water, and slope stability. For example, more resistant rocks generally are associated with steeper terrain, ridges and knolls, where the soils tend to be relatively shallow and, thus, limited for subsurface sewage disposal systems. Softer rock types, such as sandstones and shales, will weather to form deeper soil layers and deposits of eroded materials. However, soil permeability can vary widely, depending upon the degree of weathering that takes place (i.e., to form clays) and the mineralogy of the rock.

The type and structure of the bedrock has a strong influence on groundwater conditions, which, in turn, affects the suitability and potential impacts of on-site sewage disposal. In hard rock areas, water movement is generally restricted to fracture zones, often referred to as the secondary permeability, which may offer little in the way of treatment and possesses the potential for wastewater to be transported significant distances in an anaerobic state. Some rock types, such as sandstones, conglomerates, and limestones, have significant primary permeability, which provides for transmission of water through the interstices in the rock itself, where additional filtering and treatment can occur. Contacts between different rock types or layers are often avenues for the movement of sub-surface waters; springs and seeps are often found where fractures and geologic contacts come to the surface. Where the underlying rock lacks significant primary or secondary permeability, a water table may form near the ground surface that interferes with the suitability and use of septic systems. Areas of steep slopes and weak rock types generally pose the greatest slope stability concerns and most severe limitation for subsurface sewage disposal.

iii. Percolation

The percolation test is a commonly used method of evaluating hydraulic conductivity in soils and determining the suitability and proper sizing for an on-site sewage disposal system. Although criticized because of variability in results related to technique and weather conditions, it can, in certain circumstances, be a useful tool if combined with the soil profile data. Although the Basin Plan has guidelines for percolation testing and minimum disposal area, standard practice in Butte County is not to require percolation tests for permitting on-site sewage disposal systems on existing parcels, but instead, soil classification data for establishing the total length of leaching trenches. Soil evaluation, when done thoroughly by trained and experienced professionals, can be a more reliable and consistent analytical method than percolation testing. Percolation tests are required in both CSA 4 (Paradise Pines) and the Watershed Protection Zone.

iv. Seasonal Groundwater

High seasonal, or "perched" groundwater is another factor that affects the ability of the soils to absorb and provide treatment for the effluent. A high seasonal water table can reduce the effectiveness of the soil treatment zone, be a conduit for groundwater or surface water contamination, and contribute to hydraulic failure of a disposal field, causing the effluent to back up in wastewater drains or potentially rise to the ground surface. High seasonal groundwater is a limiting factor for on-site sewage disposal suitability in the Valley region and elsewhere in the County based on site-specific soil, geology, and topographic features.

v. Slope

Slope stability, erosion hazards, and the potential for downslope seepage or breakout of effluent pose limitations on the steepness of the slope where on-site sewage disposal systems can be located. There are also practical limits for construction on steep slopes. The Basin Plan slope limitation for on-site sewage disposal systems is 30 percent.

vi. Setbacks

Minimum horizontal setback distances between on-site sewage disposal system components and various property features, as specified in the Basin Plan, are shown in Table 6-4. Setback requirements are an important regulatory device that ensure that on-site wastewater systems are not located too close to a feature, such as a water source or building, that would create future problems or incompatibilities. In addition, setbacks help ensure that infrastructure does not become damaged in natural disasters and ensures adequate operational space is provided for the on-site wastewater system.

vii. Density Considerations and Cumulative Impacts

High-density development using on-site wastewater systems can contribute to elevated nitrogen concentrations in the groundwater and/or a general rise or mounding of the water table, both of which are undesirable. Such problems are generally avoided by planning for sufficiently large lots sizes where on-site sewage disposal systems are used. As an example, the Nitrate Compliance Plan of the Chico Urban Area establishes density requirements due to the high level of nitrate loading.

TABLE 6-4 MINIMUM SEPARATION DISTANCES IN FEET

Facility	Domestic Well	Public Well	Flowing Stream[a]	Drainage Course or Ephemeral Stream[b]	Cut or "Fill Bank[c]	Property Line[d]	Lake or Reservoir[e]
Septic Tank or Sewer Line	50	100	50	25	10	25	50
Leaching Field	100	100	100	50	4h	50	200
Seepage Pit	150	150	100	50	4h	75	200

[a] As measured from the line which defines the limit of a 10-year frequency flood.
[b] As measured from the edge of the drainage course or stream.
[c] Distance in feet equals four times the vertical height of the cut or fill bank. Distance is measured from the top edge of bank.
[d] This distance shall be maintained when individual wells are to be installed and the minimum distance between waste disposal and wells cannot be assured.
[e] As measured from the high water line.

b. Alternative Wastewater Treatment Systems

Alternative systems are not currently covered under Butte County on-site wastewater regulations; however, they have been used selectively in the County. Their use has primarily been approved in response to various pressures, including need to repair aging or failed systems, community projects, and homeowner/developer interest in systems utilizing alternative technology. Some of the applications have had the involvement and oversight of the RWQCB. However, except for community or other systems permitted by the RWQCB, no program or requirements have been implemented for ongoing oversight for operation and maintenance of alternative systems. There are currently fewer than 200 alternative systems in use in the County outside of the jurisdictionally independent area of the Town of Paradise. With the enactment of enhanced nitrate-removal treatment standards for the Chico area, as well as expected elements of the AB 885 state standards process, greater demand for the use of alternative systems can be expected in Butte County in the future.

II. STORMWATER

This section describes the regulatory setting and existing conditions regarding the various methods by which stormwater management occurs in Butte County.

A. Regulatory Setting

In California, stormwater management falls under the regulatory authority of the SWRCB and the nine California RWQCBs, who are charged with the responsibility of protecting beneficial uses of State waters (ground and surface) from a variety of waste discharges, including stormwater runoff. Butte County falls within the jurisdiction of the Central Valley RWQCB.

The RWQCB's regulatory role often involves the formation and implementation of basic water protection policies. These are reflected in the individual RWQCB's Basin Plans. The SWRCB's role has historically been one of providing overall policy direction, organizational and technical assistance, and a communications link to the State legislature.

The RWQCBs may waive or delegate regulatory authority for stormwater management practices to counties, cities, or special districts. This is not mandatory; however, it is commonly done and has proven to be administratively efficient. In some cases, this is accomplished through a Memorandum of Understanding (MOU), whereby the local agency commits to enforcing the Basin Plan objectives or other specified standards that may be more restrictive. The RWQCBs generally elect to retain permitting authority over large and/or commercial or industrial stormwater runoff areas, depending on the volume and character of the stormwater. The established protocol for involvement of the RWQCB in permitting and review is established by a routine understanding through the issuance of related General Order/Discharge permits between the County and the RWQCB.

1. Clean Water Act

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the act was significantly reorganized and expanded in 1972. "Clean Water Act" became the act's common name with amendments in 1972.

Under the CWA, the Environmental Protection Agency (EPA) has implemented pollution-control programs such as setting wastewater standards for industry. EPA has also developed national water quality criteria recommendations for pollutants in surface waters.

The CWA made it unlawful to discharge any pollutant from a point source into navigable waters unless a permit was obtained.

2. FEMA Flood Zones

The Federal Emergency Management Agency (FEMA) has designated areas in Butte County that have a higher likelihood of experiencing flooding from high levels of rain. These areas are broken down into zones that are labeled according to their percent annual chance of flooding. Areas within the County that are designated as having a higher likelihood of flooding would have higher flood insurance rates, and during a flood event these areas would be more likely to expose the water supply to pollutants than other areas due to erosion (i.e., the process of materials eroding or being eroded by wind, water, or other natural agents). As a result, water discharge policies and best management practices are extremely important to these areas when a project is considered. The County implements development regulations in flood zones through Chapter 26, Article IV, Flood Hazard Prevention, and is discussed in Chapter 17, Hazards and Safety.

3. National Pollutant Discharge Elimination System

The SWRCB regulates water quality in California to protect the environment and public health and to properly allocate water resources. One of the main ways that the CWA and the SWCRB can ensure that stormwater will not contain pollutants is through the National Pollutant Discharge Elimination System (NPDES) permit. The NPDES regulates stormwater discharges from three main sources: Municipal Separate Storm Sewer Systems (MS4), construction activities, and industrial activities. All three sources require different NPDES permits to regulate and enforce mitigation measures within specific physical boundaries before stormwater is discharged to prevent harmful pollutants from running off into local, State, and federal surface waters such as lakes, streams, and rivers.

4. MS4 Permits

MS4 Permits are NPDES permits issued by the EPA, by way of the SWRCB, and authorize governmental entities to discharge stormwater collected by their storm sewer systems to waters of the United States. Butte County, the Town of Paradise, and the Cities of Chico and Oroville have their own traditional SWRCB Small Phase II MS4 Programs. Additionally, within Butte County, California State University Chico and the Silver Dollar Fairground have their own non-traditional MS4 Programs with the State. Each MS4 permit holder has their own management plans for stormwater and associated discharges.

5. Stormwater Management Program

Butte County's Storm Water Management Program (SWMP) was last revised in September 2003. It provides an outline of how the County plans to implement the conditions and requirements of its MS4 Permit for the several hundred miles of open drainage ditches, pipe, and detention basins that it operates and maintains.

The SWMP implements the MS4 Permit by providing public outreach about stormwater pollution and its prevention, contributing to community water body cleanups, establishing the County's Stormwater Ordinance, and requiring the implementation of best management practices (BMPs).

6. Stormwater Ordinance

Butte County has adopted a Stormwater Management and Discharge Ordinance that allows the County to enforce water pollution prevention to limit detrimental stormwater discharges. The Stormwater Ordinance can be found in Chapter 50 of the Butte County Code and further implements the County's MS4 Permit. The Stormwater Ordinance limits discharges into the County storm drain system, natural surface waters, and water courses, and requires the implementation of BMPs to prevent the discharge of pollutants to the maximum extent practical. The County has the authority to inspect, monitor, and enforce implementation of BMPs and prohibit illicit discharges.

B. Existing Conditions

Butte County encompasses just over 1 million acres of land and is divided by three topographical features: valley, foothills, and mountainous region of the northern Sierra Nevada and the Southern Cascade Mountains in the northeast and the valley section in the southwest. Butte County elevations range from 60 feet in the valley section to over 7,000 feet above median sea level (AMSL) in the mountainous region.

1. Climate and Topography

Butte County is in the Sacramento River Hydrological Region, and has a Mediterranean climate with cool, wet winters and hot, dry summers. Average annual precipitation generally increases from west to east across Butte County, associated with increasing elevation. Moisture-laden weather patterns from the Pacific Ocean travel west to east across California and Butte County during the winter months. Air cools as it moves east, and it is lifted over the Sierra Nevada through the process of orographic cooling. This process results in condensation of moisture and precipitation. Precipitation is strongly seasonal, occurring generally between October and March or April, with about two-thirds of the total annual precipitation generally occurring between November and February. As an example of the difference in precipitation between the western and eastern portions of the county, precipitation measured at the Chico University Farm between 1981 and 2015 averaged 27.0 inches, varying from 13.2 inches in 2007 to 48.0 inches in 1998. In Paradise, precipitation averaged 55.8 inches between 1981 and 2015, varying from 34.8 inches in 2014 to 102.3 inches in 1995.[7]

2. Watersheds

There are seven watersheds in Butte County, described below.

a. Big Chico Creek Watershed

Big Chico Creek originates from a series of springs that flow off the Sierra mountains to form a main channel at Butte Meadows. Big Chico Creek flows 45 miles from its origin, crossing portions of Butte and Tehama Counties, to its confluence with the Sacramento River. The Big Chico Creek Watershed also encompasses three smaller drainages to the north: Sycamore, Mud, and Rock Creeks. Closest to Big Chico Creek is Sycamore Creek, which originates at approximately 1,600 feet in elevation and is a tributary to Mud Creek. Mud and Rock Creeks, further north, originate between 3,600 and 3,800 feet in elevation.

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[7] Butte County. Water Inventory & Analysis Report. 2016.

Mud Creek drains off Cohasset Ridge to the south, flowing 26 miles to its confluence with Big Chico Creek. Rock Creek drains the north side of Cohasset Ridge and flows 28.5 miles before it joins Mud Creek.[8] The Big Chico Creek watershed is approximately 72 square miles (107,948 acres), with an average annual discharge of 102,100 acre-feet (AF). Winter flows average more than 300 cubic feet per second (cfs), with summer averages dropping to 30 cfs.[9]

b. Butte Creek Watershed

Butte Creek originates in the Lassen National Forest at over 7,000 feet in elevation. Butte Creek travels through canyons through the northwestern region of Butte County and then through the valley, entering the floor near Chico. The northern Sierra and southern Cascade mountain ranges divide the valley section from the mountainous section of the Butte Creek watershed in Butte County. Once Butte Creek enters the valley section of the watershed near Chico, it travels approximately 45 miles before it enters the Sacramento River.[10] Levees were constructed along Butte Creek in the 1950s by the US Army Corps of Engineers (USACE). These levees extend for over 14 miles along the Butte Creek channel. The Butte Creek watershed is approximately 809 square miles (162,199 acres). The mean monthly flow near Chico is 417 cfs, with peak flow occurring mid-February averaging 826 cfs. September typically sees the lowest flows, averaging 119 cfs. Downstream from Chico, instream flows typically range from 5 to 25 cfs during irrigation season.

c. Cherokee Watershed

Cherokee Canal, which was originally constructed to protect agricultural land from mining debris, now serves as an irrigation drainage canal. Dry Creek becomes Cherokee Canal northeast of Richvale, and Gold Run and Cottonwood Creek join the Cherokee Canal upstream of the Richvale Road crossing. Cherokee Canal eventually enters Butte Creek near the southwestern corner of Butte County, south of Highway 162. The Cherokee Watershed has an area of approximately 261 square miles (167,053 acres).

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[8] Big Chico Creek Watershed Alliance. Big Chico Creek Existing Conditions Report. 2004.

[9] North Sacramento Valley IRWMP Board. NSV Integrated Regional Water Management Plan. 2014.

[10] California State University, Chico. *Butte Creek Watershed Project Existing Conditions Report*. 2000.

d. Feather River/Lower Honcut Creek Watershed

After the Feather River flows through the Oroville Dam, it enters the City of Oroville and continues south, joining with the Yuba River at Marysville and Yuba City, and eventually the Sacramento River. The Feather River/Lower Honcut Creek Watershed also contains another Dry Creek, unrelated to the Dry Creek in the Cherokee Watershed. This Dry Creek is located within the City of Oroville and contains three tributaries that join together, and the main channel ends within the City of Oroville. Wyman Ravine, which originates south of the City of Oroville, drains the southern portion of the watershed, and flows into Honcut Creek. The north, middle, and south Honcut Creeks drain both the Lake Oroville/Upper Feather River Watershed and the Feather River/Lower Honcut Creek Watershed. The south fork of Honcut Creek forms the southern border of Butte County. The Feather River/Lower Honcut Creek Watershed has a total area of approximately 280 square miles (178,925 acres).

e. Lake Oroville/Upper Feather River Watershed

The North Fork of the Feather River originates in northern California in the Lassen Volcanic National Park. It flows south into Lake Oroville, where it joins the south and middle forks of the Feather River. Oroville Dam, constructed in 1968, houses six power generation units and four additional units in the Thermalito Power Plant. The Thermalito Forebay and Afterbay are holding reservoirs located downstream of Lake Oroville; they allow water released from Lake Oroville to generate power during established peak periods and to be pumped back into the lake during off-peak periods. Other smaller creeks in the watershed flow into Lake Oroville, including Cirby and Concow Creeks, which initially join to flow into the Concow Reservoir upstream of Lake Oroville. The Lake Oroville/Upper Feather River Watershed has a total area of approximately 532 square miles (340,699 acres).

f. Little Chico Creek Watershed

Little Chico Creek originates on the northwestern boundary of the Butte Creek Watershed and flows through canyons before reaching the City of Chico. Before Little Chico Creek enters the Chico urban area, it passes a diversion structure constructed in the 1960s that diverts high flow from Little Chico Creek into Butte Creek. Little Chico Creek flows through the City of Chico before entering the valley, at which point it disperses through numerous waterways within the region. The Little Chico Creek Watershed has a total area of approximately 136 square miles (87,137 acres).

g. Pine Creek Watershed

The Pine Creek Watershed is in the northeastern section of Butte County. Pine Creek, as well as Rock Creek and Keefer Slough (which are in the Big Chico Creek watershed), drain part of the northern region of the Big Chico Creek Watershed and eventually drain into the Sacramento River. The Pine Creek Watershed has a total area of approximately 47 square miles (29,938 acres).

3. Special Districts

The California Water Code allows for the formation of special districts with elected legislative bodies that are designed with specific functions relating to water resources, such as the construction, operation and maintenance of infrastructure that conveys and stores stormwater to designated areas for groundwater recharge and the protection of infrastructure and private property. Beneficiaries of those special districts, including property owners, are assessed a fee to fund the special activities. As of 2018, there are eight drainage and reclamation districts within Butte County:[11]

- Drainage District No. 1 serves approximately 6,249 acres and is located adjacent to the City of Gridley, east of the Feather River.
- Drainage District No. 2, covers approximately 7,587 acres and is located near the town of Nelson in southwestern Butte County.
- Drainage District No. 100 covers 27,013 acres and an estimated population of 956 people; it is located near the town of Richvale in southwestern Butte County.
- Drainage District No. 200 serves 6,636 acres and is located between Richvale and State Route 99 in southwestern Butte County.
- Butte Creek Drainage District serves 47,852 acres and encompasses the town of Nelson and other areas in southwestern Butte County south of Durham.
- Rock Creek Reclamation District serves 4,644 acres and is located along Rock Creek between Highway 99 and Pine Creek in northwestern Butte County.
- Sacramento River Reclamation District serves 6,249 acres and is located adjacent to the Sacramento River in western Butte County up to the Tehama County line.

[11] Butte Local Agency Formation Commission. Drainage and Reclamation District Municipal Service Reviews and Sphere of Influence Plans. June 2018.

- Reclamation District No. 833 serves 38,600 acres in southwestern Butte County, encompassing the City of Gridley and extending westerly to the Cherokee Canal and Butte Creek.

4. Historic Stormwater Events and Concerns

Butte County has issued 17 disaster declarations and nine states of emergency due to flooding since 1950, ranging between 20-year to more than 100-year storms (i.e., storms of such intensity that the probability of them occurring is 5 and 1 percent each year, respectively), causing hundreds of thousands of dollars in damage.[12] Indirectly related to stormwater events, there have been 10 State and federal disaster declarations due to wildfires in Butte County. In February 2017, the Oroville Dam spillway collapsed, which resulted in flooding of the Feather River and an estimated cost of $1.1 billion.[13]

Events like flooding, wildfires, and pollutant discharges over the past several decades have raised the importance of surface water quality impacts from stormwater:

- Recent flooding events (discussed in Chapter 17, Hazards and Safety) have resulted in additional sediment transport, which can increase turbidity, suspended solids, and nutrients, which in turn reduce water clarity, cause odor issues, reduce oxygen in waterbodies, produce atypical algal blooms, and potentially increase fish/aquatic life mortality. In addition, flooding events can introduce non-native water body materials and pollutants (e.g., petroleum products, heavy metals, household cleaners/solvents, and human and animal wastes) to the flood waters. Non-native waterbody pollutants, depending on concentration, introduce a variety of constituents that can increase wildlife mortality, increase carcinogenic effects, increase flora/fauna mortalities (which depletes wildlife food supplies), and pose human health hazards.

- Recent wildfire events in Butte County have required emergency actions, during which stormwater permits, impacts, and potential mitigation have not been a focus. To date, there have been no federal requirements, actions, or funds of significance to formally mitigate or address the physical increase to stormwater runoff. Wildfire events often include the use of fire suppression materials along with water. Post-fire, many affected areas have large swathes of

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[12] Butte County. Local Hazard Mitigation Plan Update. October 2019.

[13] Department of Water Resources. Website: https://water.ca.gov/News/News-Releases/2018/Sept-18/Oroville-Spillways-Construction-and-Cost-Estimate-Update. Accessed February 2021.

burnt landscape with no effective erosion control and large amounts of burnt materials, ash, and exposed soils.

- Various illicit pollutant discharges have occurred, including pesticides, herbicides, and petroleum products. These pollutants have the potential to be transported in stormwater and sent into canals, streams, and rivers downgradient, causing harm to water-dependent ecosystems and potentially human health.

III. Solid Waste

Solid waste management is a rapidly changing utility in Butte County for several reasons. Requirements for landfill design, operations, and construction are stricter. Collection and disposal technologies have changed. Recycling requirements by State agencies also influence the way local governments solve solid waste issues. As the county grows, capacity of facilities, potential future disposal sites, funding, service areas, and support systems will need to be continually evaluated and reassessed to ensure that solid waste disposal systems and techniques remain consistent with demand, as well as changing regulations regarding source reduction and diversion.

A. Regulatory Setting

Solid waste management in Butte County is conducted under federal and State regulatory policies that are implemented and enforced by the California Department of Resources Recycling and Recovery (CalRecycle), the Regional Water Quality Control Board (RWQCB), the Butte County Air Quality Management District and Butte County Environmental Health (BCEH). BCEH is certified by CalRecycle and designated by the Board of Supervisors to act as the Local Enforcement Agency (LEA). As the LEA for the County, it is BCEH's responsibility to enforce minimum standards and conditions for Solid Waste Facilities Permits (SWFP), manage Closure/Post-closure Maintenance Plans, and investigate complaints.[14] County policy for solid waste management is implemented under the County Board of Supervisors by the Public Works Department, which is the responsible agency for administering landfill operations. The Butte County

[14] Butte County, 2020, Public Health Solid Waste, https://www.buttecounty.net/ph/Environmental-Health/SolidWaste, accessed February 19, 2021.

Integrated Waste Management Local Task Force (LTF) is an advisory body comprised of city staff, solid waste industry representatives, and members of the public. It monitors the development of the Butte County Integrated Waste Management Plan (CIWMP). The LTF serves as an advisory subcommittee of the Board.

Solid waste management occurs under several jurisdictions in Butte County. The incorporated cities of Chico and Oroville and the Town of Paradise have individual waste management jurisdictions and policies and operate independently. The City of Biggs, City of Gridley, and Butte County (unincorporated area) are current members of the Butte Regional Waste Management Authority, originally formed in December 1999, for coordinating solid waste management, including waste diversion and recycling activities as required under state of California legislation (AB 939). The Town of Paradise was a founding member, but in 2007 left to manage its solid waste program independently of the Butte County Regional Authority. The City of Gridley joined the Authority after its initial formation, in August 2002. Since its adoption, the Butte County Board of Supervisors has amended Chapter 31 of the Butte County Code, entitled "Solid Waste Collection, Management and Recycling," in an effort to update county solid waste regulations to better reflect current solid waste management regulations and requirements mandated by the State of California.

1. Federal Regulations

This section describes the federal regulatory framework related to solid waste in Butte County.

a. Resource Conservation and Recovery Act of 1976

The Resource Conservation and Recovery Act of 1976 (Title 40 of the Code of Federal Regulations), Part 258, contains regulations for municipal solid waste landfills and requires states to implement their own permitting programs incorporating the federal landfill criteria. The federal regulations address the location, operation, design (liners, leachate collection, run-off control, etc.), groundwater monitoring, and closure of landfills.

2. State Regulations

This section describes California's regulatory framework related to solid waste services.

a. Sanitary District Act of 1923

The Sanitary District Act of 1923 (California Health and Safety Code, Section 6400 et seq.) authorizes the formation of sanitation districts and enforces the sanitation districts to construct, operate, and maintain facilities for the collection, treatment, and disposal of wastewater. This act was amended in 1949 to allow the sanitation districts to also provide solid waste management and disposal services, including refuse transfer and resource recovery.

b. California Integrated Waste Management Act

California's Integrated Waste Management Act of 1989 (AB 939) required that cities and counties divert 50 percent of all solid waste from landfills as of January 1, 2000, through source reduction, recycling, and composting. AB 939 also established a goal for all California counties to provide at least 15 years of ongoing landfill capacity. To help achieve this, the act requires that each city and county prepare a Source Reduction and Recycling Element to be submitted to CalRecycle.

In 2007, SB 1016 amended AB 939 to establish a per-capita disposal measurement system. The California Integrated Waste Management Board (CIWMB) sets a target per-capita disposal rate for each jurisdiction. Each jurisdiction must submit an annual report to CIWMB with an update of its progress in implementing diversion programs and its current per-capita disposal rate.

c. Assembly Bill 341 and Assembly Bill 1826

AB 341 (Chapter 476) increased the statewide solid waste diversion goal to 75 percent by 2020. AB 341, which was passed in 2011 and took effect July 1, 2012, mandates recycling for businesses producing four or more cubic yards of solid waste per week. Under AB 341, qualifying businesses must separate recyclables from trash and then either subscribe to recycling services, haul their own recyclables, or contract with a permitted private recycler. As of January 1, 2019, all businesses that generate four or more cubic yards of commercial solid waste each week must enroll in services to collect organic material separately from other waste. Organic material includes food waste, landscape trimmings, clean wood and lumber, and unlined paper like cardboard and paper towels.

AB 1826, passed in 2014, mandates organic waste recycling for qualifying businesses and multifamily dwellings. The commercial organics recycling law took effect April 1, 2016, and was phased in over subsequent years.

d. SB 1383

In September 2016, SB 1383 was signed into law establishing methane emissions-reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants in various sectors of California's economy. SB 1383 established goals to reduce the landfill disposal of organics by achieving a 50-percent reduction of the 2014 level of statewide disposal of organic waste by 2020 and a 75-percent reduction by 2025. SB 1383 grants CalRecycle the regulatory authority to achieve the organic waste disposal reduction targets and established an additional target that at least 20 percent of currently disposed edible food be recovered for human consumption by 2025. Methane emissions resulting from the decomposition of organic waste in landfills are a significant source of greenhouse gas (GHG) emissions contributing to global climate change. Organic materials—including waste that can be readily recycled or composted—account for a significant portion of California's overall waste stream.

e. California Solid Waste Reuse and Recycling Access Act of 1991

The California Solid Waste Reuse and Recycling Access Act requires development projects to set aside areas for collecting and loading recyclable materials. This act required CalRecycle to develop a model ordinance for adoption by any local agency that provides adequate areas for the collection and loading of recyclable materials for development projects. Local agencies are required to adopt the model, or an ordinance of their own, that establishes standards, including space allocation for the collection and loading of recyclable materials.

B. Existing Facilities

Existing solid waste management facilities in Butte County consist of three transfer stations, the Neal Road public use landfill (and adjacent septage waste disposal area), and three private wood waste recyclers. The City of Chico operates its own compost site for green waste, which is located at the City airport.

Recycling, composting, and waste combustion programs in Butte County are designed to make other waste management operations more environmentally friendly and economically efficient. The Neal Road Recycling and Waste Facility helps the County meet State-mandated diversions goals while also converting waste to power for approximately 2,200 homes each year.[15] In 2020, approximately 14,390 (or about 8 percent) of the solid waste accepted at the Neal Road Recycling and Waste Facility was diverted.[16]

1. Waste Stream Assessment

The quantities of solid waste that a population generates vary according to the season, the geography, and social attitudes. Examining patterns of waste disposal in Butte County can shape development controls and serve as a barometer of economic change.

a. Current Waste Stream

Waste stream data for Butte County was collected by the Public Works Department for the year 2020. Table 6-5 shows the waste data broken down by each jurisdiction in Butte County.

TABLE 6-5 TONS OF SOLID WASTE GENERATED, BY JURISDICTION

Jurisdiction	2020 Population	Estimated Tons Generated (2020)
Biggs	1,852	434
Chico	110,326	20,101
Gridley	6,402	1,181
Oroville	19,440	5,637
Paradise	4,631	19,305
Unincorp. County	67,640	164,608
Outside of the County	---	2,419
Totals	**210,291**	**213,684**

Source: Butte County Public Works Department, *Waste Works Database and Department of Finance E-5 Population Estimates*, 2020.

The Neal Road Landfill buried approximately 163,200 tons of municipal solid waste in 2020. In addition to that total, 3,247 tons of inert materials, 4,559 tons of wood waste, 5,514 tons of scrap metal, 225 tons of tires, 574 tons of carboard and mattresses, and 270 tons of electronic waste were diverted from disposal in the landfill.[17]

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[15] Butte County, 2020, Recycle Butte, http://www.buttecounty.net/recyclebutte, accessed February 19, 2021.

[16] Craig Cissell. Deputy Director, Waste Management Division, Butte County. Personal communication with Angelica Garcia, PlaceWorks. February 16, 2021.

[17] Craig Cissell. Deputy Director, Waste Management Division, Butte County. Personal communication with Angelica Garcia, PlaceWorks. February 16, 2021.

b. Analysis of the Future Waste Stream

Population variations have a significant impact on the Butte County municipal waste stream. Table 6-6 shows projected countywide solid waste generation for 2025, 2030, and 2040 based on actual per-capita waste generation rates in 2020. Commercial and industrial growth and per-capita generation trends are also significant factors that will affect the future waste stream.

TABLE 6-6 PROJECTED COUNTYWIDE WASTE GENERATION: 2020-2040

	2020 Actual[a]	2025 Projected[b]	2030 Projected	2040 Projected
Population	210,291	230,056	241,333	262,018
Waste Generated (Tons)	177,643	187,776	196,981	213,864

[a] Population figure is January 2020 population estimate by the California Department of Finance (DOF).
[b] Projected population is from Butte County Association of Governments (BCAG). BCAG Post Camp Fire Forecasts Memo – see Table 3 (Population: Post Camp Fire Study 2018 – 2045 Forecast).
Sources: Butte County Public Works Department

C. Collection and Transfer

a. Collection of Municipal Solid Waste

Butte County is served by three licensed private haulers who provide residential, commercial, and industrial collection services for solid waste transported to the Neal Road Landfill for disposal. In 2014, the County divided the unincorporated area into three collection service areas and issued franchise agreements to three waste and recycling collection companies to service these areas. The three franchised companies provide collection and processing of commercial and residential recyclable material, green waste, and solid waste within the three franchise service areas. Waste Management serves the northwest unincorporated area of the county, Northern Recycling and Waste Services serves the northeast unincorporated area, and Recology serves the central and southern unincorporated area. All commercial waste haulers operating in Butte County are required to obtain a permit issued by BCEH after meeting requirements set forth in Butte County Code, Chapter 31. The incorporated areas of the County manage their own waste collection services.

Table 6-7 outlines the existing haulers, their service areas, contract status, and recycling efforts.

b. Transfer Stations

The three private collection firms operate three transfer stations in Butte County. The Recology Butte Colusa Counties Transfer Station is in Oroville and hosts a public recycling drop-off center, household hazardous waste facility, green waste drop-off center, and a construction and demolition sorting facility. The North Valley Disposal Transfer Station is in Chico and managed by Waste Management. Northern Recycling and Waste Services is in Paradise and provides a transfer station services as part of their franchise agreement with the County. The recycling and waste buy-back center at Northern Recycling and Waste Services is currently closed as a result of the recent wildfires and COVID-19.

The Ord Ranch Transfer Station offers waste transfer services to the Biggs and Gridley area. The Ord Ranch Transfer Station is situated on one acre and, as of 2006, was permitted to transfer up to 64 tons per day, operating only on weekends. All materials collected at the transfer station are hauled to Neal Road Landfill for disposal.

TABLE 6-7 SOLID WASTE FRANCHISE PRIVATE HAULERS – BUTTE COUNTY

Private Hauler	Service Area	Franchise/ Contract	Recycling Efforts
Recology 2720 South Fifth Avenue Oroville, CA 95965	Southern portion of the unincorporated area in the County	Franchise with County	Curbside recycling, residential and commercial yard trimmings, compost, recycling, and garbage collection
Northern Recycling and Waste Services 920 American Way Paradise, CA 95969	Paradise ridge area	Franchise with County	Curbside recycling, including green waste collection, commercial waste
Waste Management 2569 Scott Ave. Chico, CA 95928	Northwest unincorporated area of the County	Franchise with County	Curbside recycling including residential and commercial yard waste

Source: Butte County Waste Collection Provider Search, 2021.

D. Solid Waste Disposal

The primary solid waste disposal site in the County is the County owned and operated Neal Road Landfill. The Butte County Division of Environmental Health, Department of Public Health functions as the Local Enforcement Agency operating under the guidelines of the Enforcement Program Plan and the oversight of CalRecycle.

1. Neal Road Landfill

Neal Road Landfill is located seven miles southeast of Chico in the Central Buttes area, a rural area of the county characterized by topographic plateaus separated by ravines and canyons. Elevations at the site range from 210 to 460 feet MSL. The facility is one mile from the nearest residence.

The landfill is situated on 190 acres of property owned by Butte County. The landfill was operated by the Neal Road Landfill Company under contract with Butte County from 1978 through February 28, 2003. The County Public Works Department assumed daily operational responsibility on March 1, 2003. The landfill was originally opened as a burn dump in 1965. In 1970 it was converted into a sanitary landfill operation under the jurisdiction of the Department of Public Works.

The Neal Road Landfill is permitted to accept municipal solid waste, inert industrial waste, demolition materials, special wastes containing non-friable asbestos, and seepage. Hazardous wastes, including friable asbestos, are not accepted at the Neal Road facility or any other Butte County disposal facility. The permitted maximum disposal amount at the Neal Road is 1,500 tons per day.

The total capacity of the Neal Road Landfill was estimated in 2020 at 16,588,874 cubic yards (9,953,324 tons). This number is refuse capacity and was calculated by multiplying the predicted overall refuse effective density by the net fill capacity. Based on a 2-percent annual waste stream growth rate, the facility's life service is estimated to be until the year 2055.[18]

[18] Golder Associates, Inc., October 2020, Joint Technical Document Neal Road Recycling & Waste Facility. Page 14.

The Butte County Department of Public Works serves as the responsible agency that monitors the remaining capacity of the landfill site.

a. Regulatory Approval and Compliance

The Neal Road Landfill operates under Facilities Permit No. 04-AA-0002, which was originally issued by the County on February 2, 1999. As of 2007, the permit had last been revised and renewed July 19, 2005, by Butte County EHD under review of CIWMB. Butte County EHD is responsible for permitting, inspecting, and enforcing regulations at landfill sites.

Activities at the Neal Road Class III Landfill are also regulated by RWQCB Waste Discharge Requirements (WDRs) Order No. R5-2011-0049 and Monitoring and Reporting Program No. R5-2011-0049, which were originally adopted on June 10, 2011.[19] The latter regulatory permitting documents strive to protect surface and groundwater quality.

The Butte County Air Quality Management District issued a Title V operating permit for landfill operations air emissions control. Permit No. NRL-01-01-TV was originally issued to the county Public Works Department on March 3, 2003. The Butte County Environmental Health Division issues an annual permit to the Neal Road Landfill and performs frequent inspections.

b. Leachate Control

The Neal Road Landfill has mechanisms for collecting and disposing leachate. To impede the generation of leachate, a relatively impermeable cover, consisting of synthetic tarp, is installed on the landfill. Leachate is collected along the perimeter of the landfill toe in a rock drain and under landfill modules. The leachate collected in the perimeter system is discharged to a Class II surface impoundment located within the permitted landfill area. Sampling groundwater wells located near the solid waste disposal facility assist in detecting the presence, degree, and migration of leachate. As of 2007, the groundwater monitoring system at the Neal Road Landfill consisted of one upgradient and nine downgradient monitoring wells.

[19] California Regional Water Quality Board, June 2011, California Regional Water Quality Control Board Central Valley Region Order No. R5-2011-0049, page 38.

Lysimeters were installed under the disposal site in 1990 to monitor the unsaturated zone water quality. Lysimeters are instruments that measure the water that percolates through a particular depth of soil. There are ten lysimeters installed at Neal Road Landfill. Sampling and laboratory analysis of water samples collected from the monitoring wells and the lysimeters are performed on a quarterly basis. All data is reported to the RWQCB.

c. Closure and Post-Closure Maintenance

Once the Neal Road Landfill reaches capacity, closure and post-closure care procedures will be implemented to minimize potential adverse environmental effects. Closure involves capping the landfill with a low-permeability material (compacted clay and a synthetic membrane) to minimize moisture infiltration, developing and maintaining surface drainage control structures, and maintaining the function of leachate and methane collection and monitoring equipment. Post-closure care involves inspecting the site, monitoring the environment, maintaining the land surface, controlling methane, and transporting and treating leachate. Post-closure maintenance is considered a long-term obligation (minimum 30-year period) and is overseen by the CIWMB.

The eastern half (27 acres) of the previous 80-acre refuse footprint closed in 2004. The balance (21 acres) of the previous 80-acre footprint was closed in 2007, and all waste disposal activities were slated to occur on lined modules thereafter.

E. Special Wastes

This section describes the public and private services that are available for transporting, disposing, and treating a variety of solid wastes.

1. Current Special Waste Management

Medical waste, triple-rinsed empty pesticide containers, construction and demolition waste, non-friable asbestos, and bulky items such as mattresses and white goods are accepted at the Neal Road Landfill. Friable asbestos wastes are disposed of in permitted Class II landfills outside Butte County and are not allowed in Neal Road Landfill for disposal.

2. Hazardous Waste

The Butte County Public Health Department (BCPHD) manages several hazardous waste programs to protect the public and environment from exposure to hazardous waste. These programs include the Hazardous Waste Generator Program, Aboveground and Underground Storage Tank Program, and Hazardous Materials

Release Response Plan. Through these programs, BCPHD inspects businesses that handle or store hazardous materials to ensure compliance with State and federal laws.

Several Household Hazardous Waste (HHW) programs have also been implemented in Butte County. These include permanent HHW collection facilities located in Chico and Oroville. An electronic hazardous waste (e-waste) facility is operational for the Neal Road Landfill and diverted over 270 tons of waste last year.

3. Construction/Demolition Waste

Construction and demolition debris is made up of a variety of waste material including steel, asphalt, concrete, brick, plaster, wallboard, and piping. Some of this material may contain hazardous substances such as asbestos.

Butte County has designated separate areas for stockpiling and processing of clean green wastes and concrete/asphalt wastes at Neal Road Landfill and encourages cooperation with reduced fees.

4. Infectious Waste

A local company picks up and disposes infectious waste from all veterinary clinics, hospitals, and medical and dental practices.

5. Used Oil

There are approximately 25 certified oil recycling centers in Butte County that accept used engine and similar lubricating oils. Agricultural generators of waste oil have two recycling centers available: one located at Neal Road Landfill and the other located at the City of Biggs Public Works Yard.

6. Tires

Tens of thousands of old tires accumulate in Butte County every year. These scrap tires are a major problem for communities. Stockpiled and littered tires have negative aesthetic impact and increase the risk of fire and disease and provide breeding habitat for mosquitoes.

There are four identified feasible alternatives to the county's old tire supply: landfill disposal; technological transformations such as retreading; resurfacing city streets with rubberized asphalt; or energy recovery.

About 224 tons of waste tires were diverted at Neal Road Landfill in 2020. The County holds public tire amnesty events that are funded by a grant from CalRecycle and by an allocation from the Neal Road Recycling and Waste Facility.

The County was awarded a grant by CalRecycle to purchase over 540 tons of waste tire aggregate to aid in the collection of methane gas at the landfill. The collected methane gas is used to generate over two megawatts of electricity at the landfill.[20]

F. Public Education and Involvement

The success of an education and involvement program hinges on participation by the commercial sector and the media. Local commercial haulers use an extensive array of mechanisms to advance solid waste management awareness. Television programming, radio, and newspaper are used to advance public awareness.

The Butte County Department of Public Works implements public education and involvement programs for the unincorporated areas.

G. Financing and Revenues

1. Operating Revenue

Butte County solid waste management systems are funded by fees charged at Neal Road Landfill, which totaled approximately $6,500,000 per year, as of 2007. Table 6-8 outlines the existing solid waste disposal fees at the Neal Road Landfill.

2. Capital Financing

Capital financing for Butte County solid waste management operations and improvements may be accomplished through borrowing, using incoming revenues, and/or private financing. General obligation bonds are considered a stable mechanism for funding capital equipment acquisitions or facilities. Operations and maintenance revenues can be collected by one or a combination of several methods. A waste surcharge can be collected from each customer in the periodic billings of the waste haulers. Fees from building and development impact mitigation and business license renewal can also be collected. Grant funds are received from the California Department of Conservation and the California Integrated Waste Management Board for recycling and household hazardous waste

[20] Butte County, 2020, Recycle Butte, http://www.buttecounty.net/recyclebutte/, accessed February 19, 2021.

programs. Butte County also plans to explore other State and federal programs that may offer grant funds and low interest loans.

3. Multi-Jurisdictional Factors

A regional approach to solid waste management offers a number of potential financing advantages. Recycling, composting, and waste-to-energy programs require a large waste generation and collection base to generate a marketable product. Development of regional sites assures a consistent supply of materials, allowing Butte County communities to achieve economies of scale through better utilization of capital and more efficient management.

TABLE 6-8 BUTTE COUNTY NEAL ROAD LANDFILL FEES

Type of Waste	Costs
Tires	$2.00 per tire, up to 36" $4.00 per tire from 36" to 48" $13.00 per tire from 48" to 60" $200 per ton over for tires over 60" and large loads $200 per ton for altered (cut) tires
Special Handling	$60.00 per load
Commercial Haulers	$42.11 per ton
Self-Haulers	$10.00 per vehicle up to 540 lbs. $19.00 per vehicle from 541 to 1,027 lbs. $28.00 per vehicle from 1,028 to 1,514 lbs. $42.11 all other vehicles over 1,515 lbs. $1.50 32-gallon bag
Asphalt or Concrete	$8.00 per ton. No charge for clean asphalt or concrete.
Clean Fill Dirt	No charge.
Scrap Metal	$3.50 per ton
Bulky Items	$6.00 per item
Freon Containing Units	$15.00 per item
Septage	$77.11 per ton

Notes: Fees effective until January 11, 2021.
Sources: Butte County Master Fee Schedule, 2020. Please visit the County's website for a complete list of fees.

H. Source Diversion and Reduction

As described in greater detail in the Regulatory Setting section of this chapter, AB 939, the Integrated Solid Waste Management Act of 1989, requires every jurisdiction in California to develop comprehensive plans for implementing programs and policies to reduce, recycle, or otherwise divert from landfill disposal a minimum of 25 percent of each jurisdiction's solid waste stream by 1995 and 50 percent by the year 2000. The legislation now requires a 75-percent diversion to be achieved every year. The Neal Road Recycling and Waste Facility helps the County meet the State-mandated diversions goals.

1. Source Reduction

Source reduction is an approach to solid waste reduction that addresses how products are manufactured, purchased, and used.

As of the 2018 Waste Diversion Annual Report submitted to CalRecycle as a requirement of AB 939, source reduction programs offered under the Butte County Regional Management Authority included business waste reduction programming, procurement, government source reduction programs, materials exchange, drought-tolerant landscaping, and backyard and on-site composting. At the time of the 2018 Annual Report, the Butte County Regional Waste Management Authority target disposal targets were 4.9 pounds per day per resident and 24.9 pounds per day per employee.

Educating the residents in Butte County is designed to elicit assistance by the public and the private sectors in meeting goals for reducing solid wastes. Technical assistance is also available to help households and businesses track their waste output through waste audits. The County can also encourage people to reduce junk mail and encourage bulk buying source reduction goals.

2. Recycling

a. Existing Recycling Programs

Recycling, an essential practice for diverting solid wastes from landfills, is a fundamental part of the Butte County integrated waste management plan. In 2020, approximately 14,390 (or about 8 percent) of the solid waste accepted at the Neal Road Recycling and Waste Facility was diverted.[21]

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[21] Craig Cissell. Deputy Director, Waste Management Division, Butte County. Personal communication with Angelica Garcia, PlaceWorks. February 16, 2021.

Commonly recycled solid waste materials in Butte County include paper, both old newspaper and corrugated cardboard; aluminum; glass; ferrous metals; plastics, both PET and HDPE; and batteries. Industrial food processors separate food wastes for use as animal feed by farmers. Scrap metal dealers located in Butte County receives and resells ferrous metals and other so-called "white" metal goods, such as aluminum and tin. Fats and greases from grocery stores and restaurants are collected by a rendering company. Tree trimmings and yard wastes are also collected for mulch and cogeneration fuel.

Existing recycling activities and programs are overseen by the County and operated by the County at Neal Road Landfill and by the private sector at other locations.

b. Planned Programs

In 2019, Butte County applied to CalRecycle for grant funding to develop a compost facility at the Neal Road Landfill and, in 2020, CalRecycle awarded the County grant funding for the facility. A key objective of the compost facility is to divert organic wastes from the landfill. The compost facility will have a maximum capacity of 39,000 tons per year. Operations are anticipated to begin by the summer of 2021.

3. Composting

a. Existing Composting Programs

There are five compost and green waste facilities in Butte County. The facilities are located throughout the County and include Chico Greenwaste Composting, Earthworm Soil Factory, Neal Road Recycling and Waste Facility, Old Durham Wood, Recology Butte Colusa Counties Transfer Station, and Town of Paradise Vegetative Waste.[22]

Yard waste composting is a low-technology, low-cost operation that can handle a substantial portion of the municipal solid waste stream. The City of Chico owns and operates a yard waste composting program. As of 2007, about 400 cubic yards/day of leaves collected in the autumn months (40,000 cubic yards/year) were composted near the Chico Municipal Airport. The compost product is used for landscaping purposes.

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[22] Butte County, 2020, Public Health Green Waste & Composting, http://www.buttecounty.net/ph/Environmental-Health/SolidWaste/GreenWaste_Composting, accessed February 19, 2021.

Yard waste composting activities by the City of Chico have raised some concern over surface water quality in the past. In 1981, the Regional Water Quality Control Board suggested that the leaf composting operation was causing polluted leachate to enter Sheep Hollow Creek. Since that time, corrections to rectify the situation have been implemented.

b. Composting Objectives

As of 2007 programs for composting include curbside collection of residential yard waste, a drop-off system for commercial and industrial generated yard waste, and the composting facility at the Chico Airport site. The City of Oroville, City of Gridley, City of Biggs, City of Chico, and the Town of Paradise offer curbside green-waste recycling through their waste collection company.[23]

4. Solid Waste Combustion

As of 2007, Butte County had one biomass conversion facility, Pacific Oroville Power Inc. (POPI), which was the only cogeneration plant in the county. The POPI plant closed in 2012 and the County does not currently have a biomass conversion facility. POPI was located in Oroville and burned wood waste through the direct combustion process to generate electricity. The electricity was sold to PG&E. The most recently available information, which dates from 2003, notes that the plant generated 18 MW of electricity, though it was licensed at 22 MW. The wood fuel for the plant came from agricultural wastes and timber operations.

[23] Butte County, 2020, Recycle Butte, http://www.buttecounty.net/recyclebutte/, accessed February 19, 2021.

7 PUBLIC SERVICES

This chapter describes existing public services and facilities serving Butte County as well as an overview of the functions of the departments within the County. This also includes an overview of other 'non-Butte County' public services in an effort to show the broad picture of how the services of different organizations interconnect with Butte County government services. The following public services are discussed:

- County government and services, including the County Board of Supervisors and the functions of its many departments.
- Municipal governments, including Biggs, Chico, Gridley, Oroville, and the Town of Paradise.
- Coordinated fire protection system, including the Butte County Fire Department, the California Department of Forestry and Fire Protection (CAL FIRE), and volunteer fire companies, as well as collaboration with local jurisdictions' fire service agencies.
- Coordinated criminal justice system, which includes the County, City, Town, State of California, and federal agencies.
- Public education, including the Butte County Office of Education; Butte Community College; California State University, Chico; and the various Butte County school districts.
- Special districts, including water, sewer, recreation, and other special districts.
- Other governmental and quasi-governmental agencies.

I. COUNTY GOVERNMENT AND SERVICES

The basic provisions for the government of California counties are contained in the California Constitution and the California Government Code. A county is the largest political subdivision of the state having corporate powers. It is vested by the Legislature with the powers necessary to provide for the health and welfare of the people within its borders. The specific organizational structure of a county in California will vary from county to county.

A. County as Distinguished from a City

There is a fundamental distinction between a county and a city. Counties lack broad powers of self-government that California cities have (e.g., cities have broad revenue generating authority and counties do not). In addition, legislative control over counties is more complete than it is over cities. Unless restricted by a specific provision of the State Constitution, the Legislature may delegate to the counties any of the functions which belong to the State itself. Conversely, the State may take back to itself and resume the functions which it has delegated to counties (e.g., State funding of trial courts).

There is also a common misunderstanding that counties only provide services in the unincorporated areas of the county (outside of cities). This is simply NOT TRUE. In fact, Butte County provides numerous State-mandated services to city residents as well as all unincorporated county residents, as depicted below:

Agricultural Department:

Agricultural Law and Regulatory Enforcement
Weights & Measures Enforcement
Non-Domestic Pest Management Pesticide and Weed Management
Agricultural Pest Trapping/Eradication

Assessor/Auditor/Treasurer:

Property Tax Calculation/Collection/Distribution
Calamity Relief

Behavioral Health:

Substance Use Disorder Services
Mental Health Services for Medi-Cal recipients
Mental Health Services for Youth
Mental Health Services for Adults
School Based Services
Prevention Programs
Homeless Assistance
Elderly and Disabled Services

Child Supportive Services:

Enforcement/Collection of Child Support Payments

County Administrative Office:

Emergency Services Economic Development

County Clerk/Recorder:

General and Special Elections
Marriage Licenses
Death Records
Passport Applications
Voter Registration
Recording of Official Records
(land records, deeds, liens, etc.)

District Attorney:

Attorneys and Prosecutors
Prosecution of criminal violations of State and local law
Victims Assistance
Criminal Child Support Investigations
Child Abduction
Welfare Fraud

Farm, Home & 4h Advisor:

Coordinate 4H Program
Provide Advice to Farmers and Gardeners
Home Economic and Animal Care Clubs

Fire:

Fire Prevention Program First Response to Medical Emergencies
Emergency Command Center

Libraries:

Six Library Branches
Library Literacy Program
Storytime and Regular Youth Programming
Tutoring and Homework Help

Probation:

Probation-Parole
Juvenile Hall
Juvenile Hall School
Victim Witness Assistance
Youth Programs

Public Defender:
Legal Assistance to Indigent Citizens

Public Health:
WIC food voucher and nutrition education
Environmental Health & Management
Hazardous Materials Monitoring
Clinics (well baby, pregnancy, etc.)
Health Education Programs
Birth Records

Public Works Department:
Neal Road Landfill
Recycling Information
Household Hazardous Waste Facility

Sheriff:
Coroner's Services
Corrections and County Jail
Civil Process
Court Security
Concealed Weapons Permit Processing
Search and Rescue Services

Treasurer – Tax Collector:
Safekeeping & Investment of Public Funds

Veterans Services:
Benefit Assistance
Veteran Memorial Halls

Water & Resource Conservation:
Manages and Conserves Water and Other Resources for All Butte County Citizens

Welfare:
Employment and Financial Assistance
Senior and Adult Services
CalWORKs
Child Protective Services
Adult Protective Services

CalFresh
Medi-Cal Coverage
Veteran Services
In-Home Supportive Services
Adoption Assistance
Public Guardian/Public Administrator

B. County Powers

The California Constitution authorizes a county to make and enforce local ordinances that do not conflict with general laws. A county also has the power to sue and be sued, purchase and hold land, manage or dispose of its properties, and levy and collect taxes authorized by law. Many additional powers have been granted to counties by the Legislature. The powers of a county can only be exercised by the Board of Supervisors or through officers acting under the authority of the Board or authority conferred by law. In addition, the Board must follow the procedural requirements in the statute or its actions will not be valid. For example, if the Legislature has provided a method by which a county may abandon a road, that method must be followed. Also, where State law requires land use zoning by an ordinance, this statutorily prescribed method is binding on the county. On the other hand, where the law does not specifically prescribe a method for accomplishing a task, the county may adopt any reasonably suitable means.[1]

C. Butte County General Government Services

Butte County is a charter county under the 1911 Home Rule Amendment of the California Constitution. This section provides a general overview of government services in Butte County, focusing primarily on County government. The section first describes the County Board of Supervisors, City Councils, and overall County government organization, followed by a description of each County office, department, and division. Figure 7-1 displays the organization of the Butte County Government.

[1] California State Association of Counties, https://www.counties.org/general-information/county-structure-0, accessed February 11, 2021.

There are three types of County Government offices: elected, appointed, and other (other appointees are noted under the Board of Supervisors). Following is a brief description of each department within Butte County:

1. Elected Officers/Departments

a. County Board of Supervisors

Butte County is governed by a five-member Board of Supervisors elected by districts to staggered four-year terms. The Board elects a new Chair and Vice Chair at the first meeting in January of each year. The Board exercises the legislative, administrative, and appellate powers prescribed to it by the California Constitution and Statutes as well as the Butte County Charter. The Board appoints the Chief Administrative Officer (CAO) and all department heads apart from the Director of Farm, Home, and 4H who is appointed by the UC System, the General Services Director who is appointed by the CAO, the County Fire Chief who is appointed by CAL FIRE, the Chief Probation Officer who is appointed by the Superior Court, and those who are elected by the citizens of the county. The Board adopts the County budget and sets service levels for County appropriations under its control.

The Board of Supervisors adopts and amends the County's General Plan, which is its constitution for development. The Board also serves as the Butte County Public Facilities Financing Corporation Board of Directors, the Thompson Flat Cemetery District Board of Trustees, and the Butte County In-Home Supportive Services Public Authority Board. In addition, each Board of Supervisors member serves on the Butte County Association of Governments Board of Directors and the Butte County Air Quality Management District, both of which include elected representatives appointed by each of the five incorporated jurisdictions within the county.

Unlike the separation of powers that characterizes the federal and State governments, the Board of Supervisors is both the legislative and the executive authority of the county. It also has quasi-judicial authorities.

b. Assessor

The elected Assessor oversees the task of determining the value of residential, industrial, commercial, and personal property for tax purposes. The valuation of public utility property is the responsibility of the State Board of Equalization.

c. Auditor-Controller

The elected Auditor-Controller is the chief accounting officer of the County. The responsibilities of this office include providing public oversight, fiscal leadership, financial integrity, transparency and accountability through fiscal monitoring, reporting, auditing, and safeguarding of public resources. In addition, this office provides accurate and timely financial information to the Board of Supervisors, other County offices, and county residents.

d. County Clerk-Recorder

The elected County Clerk-Recorder serves as the Chief Election Official for the County. The Clerk-Recorder administers and conducts all federal, State, County, city, school, and special district elections. The clerk registers voters, conducts elections, records vital statistics and real estate documents, issues certain licenses, and maintains files on corporate and fictitious business names, and acts as the commissioner of civil marriages.

e. District Attorney

The elected District Attorney is mandated by the California Constitution and Government Code to investigate, charge and prosecute all criminal violations of the laws of the State of California as well as county ordinances and attend all courts in Butte County; mandated by the Welfare and Institutions Code to file all petitions and attend court proceedings involving criminal activities of juveniles; and mandated by the California Constitution and Penal Code to provide the Grand Jury with legal advice, conduct investigations and present evidence for all indictments. The District Attorney reviews all reports from more than 20 law enforcement and regulatory agencies throughout the county and determines whether or not to file criminal complaints.

f. Sheriff-Coroner

In the State of California, the Sheriff is a Constitutional Officer and the Chief Law Enforcement Officer for the county in which he or she is elected. As such, regardless of which agency has a primary function in a given area, it is ultimately the County Sheriff's Office that has responsibility to ensure the safety of the people residing in or visiting the County. The elected Sheriff-Coroner is the department head for the Butte County Sheriff's Office (BCSO). The Sheriff-Coroner leads the BCSO in law enforcement, criminal investigation, and crime prevention in the unincorporated areas of the county. Additionally, BCSO operates the County jail, serves civil process, and provides court security. The BCSO also functions as the County Coroner, and investigates all suspicious, violent, accidental, and unattended deaths.

g. Treasurer-Tax Collector

The elected Treasurer-Tax Collector is responsible for taxing, collecting, and controlling County funds. This office is composed of three divisions: treasury, which invests and safeguards County and school district funds; tax collection, which bills, collects, and processes property taxes; and central collections, which collects funds for most departments. In addition, this office acts as the tax collector for all cities, school districts, and special districts in the county.

2. Appointed County Officers/Departments

a. Chief Administrative Officer

The Chief Administrative Officer (CAO) is appointed by the Board of Supervisors and serves as the chief executive of County operations and as a major policy advisor. The CAO prepares the recommended County budget and is responsible to the Board for the proper and efficient administration of all County offices, departments, institutions, and special districts that are under the Board's jurisdiction.

In Butte County, the CAO's Office is responsible for the overall administration, management, and support functions for the County, including the Clerk of the Board and Community and Economic Development. In addition, the CAO's Office provides Safety and Risk Management support to County Departments. The CAO also oversees the performance of appointed department heads and manages the County's emergency services function.

b. Agricultural Commissioner

The appointed Agricultural Commissioner enforces the agricultural laws and regulations established by the California Food and Agricultural Code and the California Code of Regulations Division of Measure Standards. The Commissioner inspects seeds and plants, detects and manages pests, prepares crop reports, inspects nurseries, and controls non-domestic animals. The Commissioner works with and under the guidance of the California Department of Food and Agriculture. In addition, the Agricultural Commissioner also serves under the Division of Measurement Standards and is responsible for the inspection of scales, and the quantity control of items sold by weight, measures, or count.

c. Behavioral Health

The Behavioral Health Department provides a comprehensive range of mental health treatment and prevention services to the county. These services include a psychiatric health facility, skilled nursing facilities, residential treatment facilities, outpatient services, individual and group therapy and counseling, administration services for the chronically mentally ill, and community outreach services, including consultation and education. The Department is also responsible for administering an alcohol and drug services program that includes prevention, education, intervention, treatment, and recovery services.

d. Child Support Services

The Department of Child Support Services establish paternity and child support orders and collects and distributes child support to families throughout Butte County in an effort to enhance the quality of life and self-esteem of children in an efficient, compassionate, and professional manner. The free services offered by the Department of Child Support Services are governed by California Code of Regulations Title 22, Division 13 and include:

- Establishment of paternity;
- Location of absent parents;
- Establishment, modification, and enforcement of court orders to pay child support; and
- Collection and distribution of child support and spousal support monies.

e. County Counsel

The County Counsel serves as the civil attorney to the Board of Supervisors, elected and appointed department heads, County departments, and special districts. The Office of County Counsel currently consists of the County Counsel, five full-time attorneys, and four administrative and support staff. The Counsel is responsible for providing advice on legal matters, preparing legal opinions and draft ordinances, representing the County before the legislature as directed, formulating litigation strategies, and overseeing legal research and investigations. The Counsel also acts as trial counsel in State court, federal court, and administrative proceedings.

f. Department of Development Services

a. Planning Division

The Planning Division is responsible for developing land use plans (such as Butte County General Plan 2030) that concern the physical development of the county. This Division is responsible for administration and implementation of the policies and programs identified in approved plans, which includes processing land use permits, General and Specific Plan amendments, and making land use related recommendations to various committees and commissions. The Planning Division reviews plans with the Board of Supervisors, Planning Commission, Land Conservation Act Committee, Airport Land Use Commission, Interdepartmental

Development Review (IDR) Committee, Surface Mining Aggregate Operations Committee, and others, as needed.

b. Building Division

The Building Division enforces the provisions of the California Building Standards Code, including the Health and Safety Code and Title 25. The Division investigates complaints and issues citations for code violations and implements the Abandoned Vehicle Abatement, the Medical and Nonmedical Cannabis Ordinance(s), Noise Control Ordinance, and Nuisance Abatement Programs. In addition, the Division provides support to the Building Code Board of Appeals, the Disabled Access Board of Appeals and the Code Enforcement Advisory Board.

g. Employment and Social Services/Public Guardian/Public Administrator

The Department of Employment and Social Services (DESS) administers federal, State, and County-funded public assistance and social services programs. These programs include temporary assistance to needy families and employment related services through the CalWORKs program; CalFresh; Medi-Cal; County Medical Services; Foster Care; County General Assistance; In-Home Supportive Services and Adult Protective Services for the frail elderly and Child Protective Services for the children.

The Public Guardian serves as conservator of a person and/or estate of individuals who are physically or mentally disabled and are in need of protective intervention. The Public Guardian only becomes involved if no family or friends are able or willing to become the conservator and all alternatives to conservatorship have been ruled out. The Public Administrator is responsible for administering the estate of county residents who die without a will or family in California. The Public Administrator also administers the county's indigent burial program.

h. Farm and Home Advisor

This department provides educational and advisory services in agriculture, floriculture, and home economics to county residents, and sponsors local 4-H clubs. The department operates through an agreement with the University of California Cooperative Extension.

i. Fire

The Butte County Fire Department (BCFD) contracts for staff with CAL FIRE. Under this contract the County pays CAL FIRE salaries and benefits, as well as other related costs, to staff County-owned fire stations and apparatus. CAL FIRE and BCFD provide service to the entire county, with the exception of the cities of Chico and Oroville. The El Medio Fire District used to provide fire protection services to the unincorporated area south of Oroville; however, the El Medio Fire District stopped operating on December 25, 2020. The BCFD, in conjunction with the City of Oroville, agreed to provide fire protection services within the El Medio Fire Protection District until an official agreement for services is completed.[2] The County also funds the Butte County Volunteer Firefighter Program, which is a key component of the overall County fire protection system, adding additional staff, equipment, and stations to the County system. The County Fire Department is responsible for providing all fire and rescue services within the area designated the Local Responsibility Area (LRA), as well as all non-wildland fire and rescue services within the area designated the State Responsibility Area (SRA). Emergency services are provided at 39 stations throughout Butte County. Between the two agencies, CAL FIRE and BCFD maintain a fleet of firefighting equipment, including fire engines, bulldozers, crew transport vehicles, administrative vehicles, trailers, forklifts, construction equipment, support units, and all-terrain vehicles, all available to the residents of Butte County, as needed. The fleet is maintained by a preventive maintenance program with the goal of avoiding unscheduled repairs and breakdowns of the fleet.

j. General Services Department

General Services is responsible for the management of certain support service offices and internal service divisions. The service delivery system operated by General Services includes:

- *Administration.* Provides administrative and fiscal oversight for the General Services divisions.
- *Purchasing Services.* Establishes criteria for standardization of equipment and materials that are utilized by many different departments. Handles the purchase/rental and sale/disposal of all personal property on behalf of the County.
- *Property Management.* Handles the purchase, acquisition, lease or sale of real property on behalf of the County. Maintains an inventory of all real property owned by, leased by, or leased to the County. Makes recommendations for the acquisition, sale, or disposal of real property in the County's best interest.

[2] John Gaddie. Fire Captain, Butte County Fire Department. Personal communication with Angelica Garcia, PlaceWorks. February 25, 2021.

- *Contracts Management*. Handles the review and execution of contracts for all County departments, maintains the contracts section of the Contracts/Purchasing Manual and the County Purchasing Ordinance, provides contract templates and contracts training for all County departments.

- *Capital Improvements*. Handles the planning, design, and construction of buildings and facilities needed by the County to provide for the efficient and cost effective service to the citizenry.

- *Veterans Services and Veterans Memorial Halls*. Provides assistance to veterans and their dependents in filing claims against the federal government for compensation and pensions. Approves and schedules use of the County-owned veterans memorial halls, and collects rents/deposits.

- *Facilities Services*. Provides maintenance and security of assigned County-owned or leased properties and facilities. Designs and constructs special equipment as required to meet specific needs. Participates in planning and acceptance of new construction and remodeling of County-owned facilities. Provides grounds maintenance and custodial support of assigned owned properties and facilities.

- *Duplicating (Print Shop)*. Handles duplication, printing, and contract services of County forms and publications. Coordinates the lease and maintenance of all County convenience copy machines.

- *Storeroom and Mail Systems*. Operates a central warehouse of common use supply items. Provides an interdepartmental courier and message service between all County facilities. Provides a centralized collection and mailing operation for outgoing U.S. Mail. Acts as the surplus equipment clearinghouse for the redistribution of County assets between departments.

k. Human Resources Department

The Human Resources Department recruits, examines, and certifies qualified employees for County departments. In this capacity, the Human Resources Department provides human resource services, including compensation and employee benefits and administration of employee relations. The Human Resources Department also provides a program of personnel services to all County departments.

l. Grand Jury

The Grand Jury is a body of 19 citizens selected annually from a panel of prospective jurors by the Superior Court. It is funded by Butte County. The Grand Jury may bring criminal charges by way of indictment against a person; bring charges of misfeasance or malfeasance against an official of government or of a public agency that may result in removal from office; and investigate the operation of city and county governments, as well as tax supported agencies and districts created by state law within the county.

m. Information Systems Department

The Information Systems Department provides technical and communication services to Butte County departments, as well as some outside agencies.

Information Systems provides the wide-area networking services for the County of Butte. These services include housing/maintaining the wide-area networks, network hardware and operating systems that provide County departments, and related agencies, with wide-area networking connectivity, e-mail services, secure Internet/Intranet access, data warehousing, and centralized housing of departmental electronic assets. In addition, Information Systems provides network engineering services, network security, countywide desktop support and housing of County departmental servers and related operational equipment.

Communications provides and maintains the equipment and technology that serves the voice communications infrastructure for Butte County departments and related agencies. This includes providing and managing radio, phone, voicemail, cellular phones, and pager services. In addition, Communications is responsible for all radio and related voice communications for the Butte County public safety and general government radio networks, as well as being the 9-1-1 coordinator for the County's Public Service Answering Points, which includes all law enforcement jurisdictions in both the incorporated and unincorporated areas of the county.

n. Library

Chartered in 1913, the Butte County Library has served as an important cultural and educational resource for the people of Butte County for nearly a century. During the 1960s and 1970s, a number of individual city libraries were consolidated into the County library system. Today, Butte County Library is the sole provider of public library services in the county. As such, the Butte County Library provides library services to all county residents through a consolidated operation from its headquarters in Oroville and branches in Biggs, Chico, Durham, Gridley, and Paradise.

Originally established in the Butte County Charter, the Butte County Library system currently consists of six branch libraries and a literacy program. In its branches, the library houses a collection of over 190,177 items, including books, videos, DVDs, music CDs, and books on tape and CD, most of which are available for checkout by library cardholders. In addition, Butte County Library offers access to digital collections, including e-books, audiobooks, e-magazines, movies, and an online database to assist with research and homework. The library is a member of the North State Cooperative Library System and the Northnet Library System, which is aimed at providing a consolidated network of public and academic libraries that pool resources for interlibrary loan service, access to specialized reference services, and cooperative planning for regional service.

Butte County Library branches also provide children's story time programs, book discussion groups for adults, film screenings and other entertaining and educational programs. Free public meeting rooms are available in most branches, and the library provides free public access to the Internet and word processing programs at each location through its network of public computers. In fiscal year 2019-2020, the library provided library services to over 299,000 visitors and checked out over 311,000 items.

o. Probation

The Probation Department provides mandated and discretionary probation services to the adult and juvenile courts in the county. These services include investigations, sentence recommendations, supervision of persons placed on probation, and the administration of several programs, including victim witness program, the school dropout prevention program, and juvenile hall. The Department operates under the direction of the Chief Probation Officer who is appointed by the Superior Court.

p. Public Defender

The Public Defender offers legal counsel to those citizens who have been charged with a criminal offense and who are unable to provide for their own legal defense, as required by State and federal requirements. The court appoints the Public Defender at the request of the defendant or of the court. The County contracts with a consortium of private attorneys in the area to provide these legal services.

q. Public Health

The Public Health Department administers public health programs to promote individual, community, and environmental health within the county. These public health programs include County medical services; chronic disease control; maternal and child health; dental health; communicable disease control; health services for the elderly; emergency and disaster services; nursing field services; animal control and health education. The environmental health programs provide services that monitor food, housing and institutions, solid waste, water supply, and hazardous materials within the county.

r. Public Works Department

The Public Works Department is responsible for maintaining County roads and bridges and administration of the Neal Road Landfill. The services provided by this department include general administration, operation, engineering, construction, and mapping. In addition, the Department supervises several public works areas, including land development, County Service Areas, refuse disposal, and County lighting districts.

s. Water and Resource Conservation Department

Butte County's Department of Water and Resource Conservation manages and conserves water and other resources in Butte County. The Department monitors and evaluates groundwater conditions, supports sustainable water supplies, provides water education for the public, and advocates for the preservation of Area of Origin statutory protections and other established surface water rights.

II. MUNICIPAL GOVERNMENTS

City and town councils govern the five chartered or general law cities in Butte County: The Cities of Biggs, Chico, Gridley, and Oroville, and the Town of Paradise. There are also a number of joint City-County boards, commissions, and committees that are responsible for issues that affect both the municipalities and the unincorporated areas of the county, including airports, public transit, and waste management.

According to the California Department of Finance, as of January 2020, approximately 84 percent of California's residents live within a city. In Butte County, by percentage, the actual number is much less at 68 percent of residents living within the city/town limits.

City of Biggs

Biggs, incorporated in 1903, is a full-service, general law city located in the southerly area of Butte County. In addition to providing police, fire and public works services, the city also operates electric, sewer, and water utilities. The City contracts with the County for police services and with the California Department of Forestry and Fire Protection for fire services.

Biggs is approximately 25 miles south of the City of Chico and 5 miles north of Gridley, at an elevation of 93 feet. The city can be accessed from the north and south via Highway 99 and is approximately 2 miles north of the City of Gridley. The 2020 population for Biggs was estimated as 1,852.[3]

A. City of Chico

The City of Chico was founded in 1860 by General John Bidwell and incorporated in 1872 with a population of approximately 1,000 persons in an area of 6.6 square miles. The City of Chico, with recent annexations, has grown to a 33-square-mile charter city of 110,326 in 2020.[4] Chico is located in the Northern Sacramento Valley of California, approximately 90 miles north of Sacramento, in Butte County, east of Interstate 5.

Chico maintains an historic downtown, a wide variety of services, and family-oriented neighborhoods. Chico is known as a well-managed city that values quality infrastructure and services, and maintains a special sense of community and small-town living as it has developed into a vibrant regional center for business, recreation, and cultural activities. There are also many recreational opportunities in and around Chico. Bidwell Park, one of the largest municipally owned parks in the nation (3,670 acres), is the focal point of the City's park system and offers numerous trails for biking, hiking and equestrian use.[5]

[3] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark.*

[4] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark.*

[5] City of Chico, California, *http://www.chico.ca.us*, accessed February 11, 2021.

City of Gridley

The City of Gridley was founded in 1905 and is in the southwest corner of Butte County, approximately 5 miles south of the City of Biggs. State Route 99 runs in a north-south direction through the eastern portion of the city, and the Union Pacific Railroad extends through the center of the city. The City has a small commercial area that serves most daily needs of its residents, but most shopping for major items occurs in the other population centers (e.g., Chico or the Marysville-Yuba City area). Most of Gridley's working residents are employed in activities related to farming or in local retail and services. Some residents are farm workers who live in Gridley on a seasonal basis. A large percentage of the population is retired and not in the labor force. The 2020 population for Gridley was 6,402 people.[6]

B. City of Oroville

The County seat, Oroville, was incorporated in 1906. Located at the intersection of the Feather River and the Sacramento Valley, Oroville was a prime service location for the valley and foothill regions. During the gold rush, early settlers provided supplies to the foothill mining industries, including Bidwell's Bar, now submerged under Lake Oroville. Following the gold rush, Oroville became a supply center for local agriculture, including cattle ranches and orchards. Oroville also began to and continues to supply recreational users, including anglers, campers, hikers, and other visitors to the Sierra Nevada. In 1968, the Oroville Dam was completed and created a demand for housing for workers and their families. Oroville is primarily a single-family residential community with a historic downtown district and a main commercial corridor along Oroville Dam Boulevard. The 2020 population for Oroville was 19,440.[7]

C. Town of Paradise

Incorporated in 1979, the Town of Paradise was first established on a foothill ridge to supply the gold rush. The Town's relatively flat topography and accessible water supply promoted its development. Although gold mining in the Paradise area continued to be viable after the gold rush waned, the region's population decreased in the latter part of the 19th century and the economy shifted to an agricultural one, focused around small fruit plantations. In the early 1900s, the Diamond Match

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[6] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark*.

[7] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark*.

Company opened a sawmill in the nearby community of Stirling City, followed by a railroad connecting it to Chico. This railroad included a station in Paradise, leading to more substantial growth in its agricultural production industries. In 2018, prior to the devastating Camp Fire in November, the population of Paradise was 26,256.[8] The 2020 population for Paradise was less than 20 percent of that pre-fire population with 4,631 people.[9]

III. REGIONAL FIRE PROTECTION SYSTEM

This section describes fire protection services in the unincorporated county. The Butte County Fire Department (BCFD), with support from CAL FIRE, provides fire protection to unincorporated areas of Butte County, the Cities of Biggs and Gridley, and the Town of Paradise. The incorporated jurisdictions of Chico and Oroville. play an important role in providing fire protection services in the areas within their jurisdictions, as well as coordination with BCFD in the areas surrounding their jurisdictions. The El Medio Fire District used to provide fire protection services to the unincorporated area south of Oroville; however, the El Medio Fire District stopped operating on December 25, 2020. Since then, the BCFD and City of Oroville have agreed to provide fire protection services within the district's service area until an official agreement for services is completed.[10] CAL FIRE also operates its own seasonal stations and an air attack base within the county. Additionally, the U.S. Forest Service provides seasonal wildland fire protection in the Plumas and Lassen National Forests, which have small portions within Butte County.

A. Butte County Fire Department

Since 1931, the County has contracted with CAL FIRE to provide staffing to the BCFD through an annual cooperative agreement. Under the terms of this agreement, the County funds CAL FIRE professional command, fire-fighting, and administrative staff to operate the BCFD. Through this arrangement, CAL FIRE

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[8] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark.*

[9] State of California, Department of Finance, May 2020, *E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Census Benchmark.*

[10] John Gaddie. Fire Captain, Butte County Fire Department. Personal communication with Angelica Garcia, PlaceWorks. February 25, 2021.

and the BCFD function together as a fully consolidated fire protection agency and provide cost-effective fire protection service for Butte County.

1. Service

BCFD provides emergency services to all of Butte County, protecting over 1,600 square miles, several municipalities, and the entire unincorporated county population.

BCFD services include fire control for structural, vegetation, vehicular and other unwanted fires; emergency medical service, technical rescue response; hazardous materials response; flood control assistance; fire prevention and public safety education; fire law enforcement/arson investigation; and vegetation management. In addition, the BCFD operates county-wide dispatch services, coordinates major emergency response within the county as the Office of Emergency Services operational area coordinator, and provides training for career and volunteer fire fighters.

In 2020, the CAL FIRE and BCFD Emergency Command Center (ECC) processed 12,293 calls for service within the unincorporated areas of the county, with more than two thirds of which were for emergencies such as medical services, traffic collisions, and public assistance. BCFD also responded to 679 fires, of which 273 were vegetation fires. In 2020, the BCFD responded 12 times to incidents involving chemicals or hazardous materials. Other responses, such as public assists, traffic collisions, false fire alarms, assists to other agencies, medical response, downed powerlines, and law enforcement operations totaled 2,285 responses.[11]

In addition to fire engine responses, in 2020, the Butte Fire Center provided 36,702 hours in fuel-reduction project work, including controlled burns and fire crew training. The Fire Prevention Bureau also assisted with 297 law enforcement incidents and completed 5,156 defensible space inspections across the county. The department's ECC provides Emergency Medical Dispatch (EMD) services. In 2020, the ECC provided EMD instruction to 5,598 callers. EMD procedures provide lifesaving instructions such as Cardiopulmonary Resuscitation (CPR), control of bleeding, childbirth, choking, and other emergency medical information before fire engines and paramedics arrive.

[11] John Gaddie. Fire Captain, Butte County Fire Department. Personal communication with Angelica Garcia, PlaceWorks. February 25, 2021.

2. Automatic Aid and Mutual Aid Agreements

The BCFD has established automatic aid agreements and mutual aid agreements with other fire protection agencies to provide optimal fire protection service to the entire county. Automatic Aid agreements allow the resources nearest to an emergency situation to be dispatched on the first alarm regardless of jurisdiction, while mutual aid agreements require a specific request for help on an incident-by-incident basis, The BCFD has automatic aid agreements with all fire-fighting agencies in the county, as well as with the U.S. Forest Service, Lassen and Plumas National Forests, Hamilton City in Glenn County, Sutter County, Tehama County, and several fire districts in Yuba County.

3. Volunteer Fire Companies

BCFD is supported by 124 volunteer fire fighters. These volunteers are organized into 16 local companies and are an integral component of the fire protection system in Butte County. The volunteer companies are dispatched by the CAL FIRE/BCFD ECC as needed. The volunteer companies make up an essential part of the County fire protection system, often providing the first response to an emergency in the rural portions of the county that are some distance from a BCFD or CAL FIRE station.

Although the volunteer companies are organized within and supported by the local communities, they operate as part of the county-wide fire protection system and receive regular training by the BCFD and CAL FIRE career fire fighters. Recruitment and retention continues to be a problem within the BCFD volunteer fire company program. This problem is not unique to the fire service in Butte County; it is a nationwide issue. From 2016 to 2019, BCFD volunteer numbers decreased by 17 percent.

The volunteer facilities include shared stations with the BCFD, stand-alone stations, and in a few cases, stations in name only, where the equipment is kept outside. The volunteer companies are listed in Table 7-1, as are CAL FIRE and BCFD stations. Figure 7-1 displays the locations of fire stations operated by CAL FIRE, BCFD and other agencies.

4. Organization

The BCFD is organized into two divisions. The North Division covers the Chico, Durham, and Paradise areas primarily, and works in cooperation with the City of Chico and the Town of Paradise. The South Division covers Oroville and surrounding area and works in cooperation with the cities of Gridley and Biggs. Administration support staff are also available to assist the BCFD with finances, human resources, and other support services.

The North and South Divisions are divided into seven battalions, each of which in turn are made up of a mixture of BCFD and CAL FIRE stations and volunteer fire companies. Within the county fire department system, there are 26 fire stations staffed with career firefighters in the summer and 16 fire stations staffed with career firefighters in the winter. Career-staffed personnel include 71 personnel in the summer and 54 personnel in the winter.[12] The North and South Divisions also include 16 volunteer fire companies and the Chico Air Attack Base at the Chico Municipal Airport.

TABLE 7-1 FIRE STATIONS IN THE UNINCORPORATED AREAS OF BUTTE COUNTY

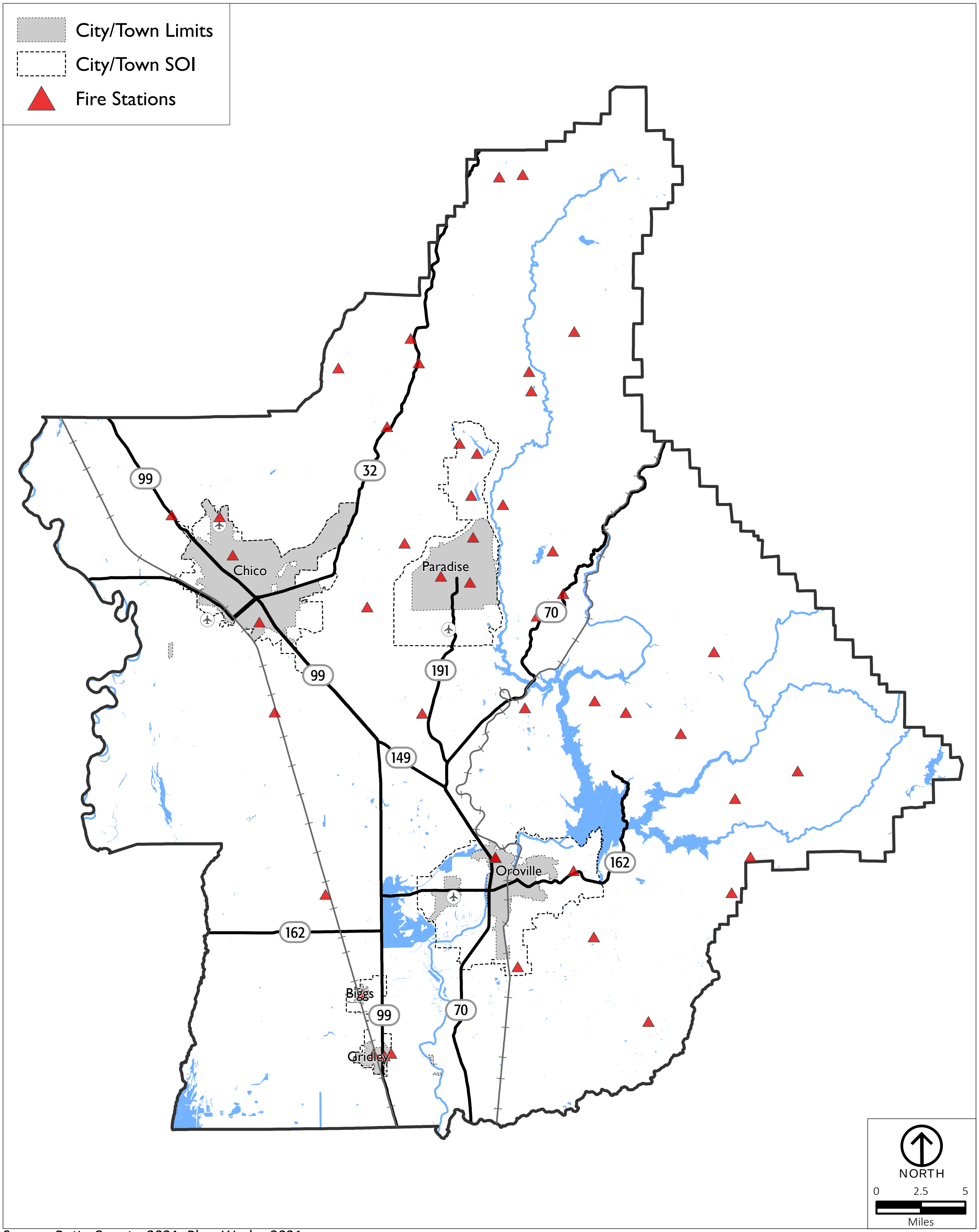
No.	Location	Type
10	Butte Meadows	BC Volunteer
11	Butte Meadows (open during fire season only)	CAL FIRE/LNF
12	Stirling City	BC Volunteer
13	Stirling City	CAL-FIRE/BCFD (Amador)
17	Butte Fire Center	CAL FIRE
21	Cohasset	BC Volunteer (No station)
22	Cohasset (open during fire season only)	CAL FIRE
23	Forest Ranch	CAL FIRE/BCFD (Amador)
24	Forest Ranch	BC Volunteer
25	Butte Valley	BC Volunteer
26	Centerville Canyon	BC Volunteer
27	Centerville Canyon	BC Volunteer
31	Magalia	BC Volunteer
33	Magalia	BCFD/BC Volunteer
35	Paradise	CAL FIRE/BCFD (Amador)
36	Jarbo Gap	CAL FIRE/BCFD (Amador)
37	Concow	BC Volunteer
38	Concow	BC Volunteer
41	Nord	BCFD
42	North Chico	BCFD/BC Volunteer

[12] John Gaddie. Fire Captain, Butte County Fire Department. Personal communication with Angelica Garcia, PlaceWorks. February 25, 2021.

TABLE 7-1 FIRE STATIONS IN THE UNINCORPORATED AREAS OF BUTTE COUNTY (CONTINUED)

No.	Location	Type
44	South Chico	BCFD
45	Durham	BCFD/BC Volunteer
51	Feather Falls (open during fire season only)	CAL FIRE
52	Feather Falls	BC Volunteer
54	Robinson Mills	CAL FIRE/BCFD (Amador)
55	Bangor	BCFD
60	Brush Creek	BC Volunteer
61	Berry Creek	BC Volunteer
62	Harts Mill	CAL FIRE/BCFD (Amador)
63	Oroville	CAL FIRE/BCFD
64	Kelly Ridge	BCFD/BC Volunteer
66	Wyandotte	BC Volunteer
67	Cherokee	BC Volunteer
71	Richvale	BCFD/BC Volunteer
72	Palermo	BCFD
73	Biggs	BCFD
74	Gridley	BCFD/BC Volunteer

Notes:
BCFD=Butte County Fire Department
BC Volunteer=Butte County Volunteer
CAL FIRE/BCFD (Amador)=CAL FIRE station that is paid in part by the County during non-fire season
BCFD/BC Volunteer=Butte County Fire Department combined with Butte County Volunteer
Source: Butte County Fire Department.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE 7-1

FIRE STATIONS MAP

5. BCFD/CAL FIRE

The year-round BCFD stations, situated in a number of communities, were built to serve the needs of expanding local populations. Each of the BCFD stations is staffed with at least two fire fighters 24 hours per day.

The CAL FIRE stations are located primarily in the foothills of the eastern portion of the county. These stations operate primarily during the summer wildfire season, although a number of stations are staffed year-round to provide protection to county residents. In addition, CAL FIRE operates the Chico Air Attack Base, which includes an air tanker that is capable of hauling 1,200 gallons of fire retardant to provides a fast initial attack to help CAL FIRE attain its goal of stopping 95 percent of all vegetation fires at 10 acres or less.

The BCFD and CAL FIRE headquarters, Administrative Division, Emergency Command Center (ECC), Fire Prevention Bureau and Fleet Maintenance activities are in Oroville. The need for additional fire stations and replacement of existing stations is being considered by Butte County.

CAL FIRE operates 60 fire-fighting and support vehicles as well as one air tactical aircraft and one air tanker from the Chico Air Attack Base during fire season. The BCFD operates 88 fire-fighting and support vehicles. This number includes vehicles assigned to BCFD stations and those assigned to volunteer companies. The BCFD runs a preventative maintenance program to help maintain the fleet to avoid unscheduled repairs and breakdowns.

6. City of Chico Fire Department

The City of Chico Fire Department operates four fire stations and firefighters staff these stations 24 hours a day year-round. The stations are staffed by 60 full-time fire fighters; 57 of the firefighters are uniformed. Additionally, there are currently eight active volunteer firefighters in the department. The Department provides response to structural, vegetation, vehicle and other unwanted fires, medical aid and other rescues services to Chico city residents. The area covered by the City of Chico Fire Department is 33 square miles. In accordance with the Chico Urban Area Fire and Rescue Agreement (an automatic-aid agreement), the Department provides first response to emergencies in the unincorporated county area surrounding the city, when the City engine is the closest resource. In exchange, County resources respond to city emergencies when a County engine is the closest resource.

7. City of Oroville Fire Department

The City of Oroville Fire Department operates one fire station that covers a service area of 13 square miles. The Department provides service to Oroville residents and, through an automatic aid agreement with BCFD and CAL FIRE, provides first response in the unincorporated County surrounding the city. The response to hazardous materials incidents is facilitated by a joint-powers agreement with the Butte County Hazardous Materials Team. The local Fire Chiefs Association provides fire training support in the city and coordinates emergency medical services.

8. Town of Paradise Fire Department

The Town of Paradise Fire Department has a cooperative agreement with CAL FIRE that provides staffing for three fire stations. Two of the fire stations are staffed with three-person engines and one station is staffed with a two-person engine. In addition, CAL FIRE maintains a fire station in the neighboring community of Magalia and the resources at the station are available to the Town if needed. The Town of Paradise Fire Department also employs a fire marshal, fire prevention inspector, and administrative assistant. The Department responds to fires, emergency medical services, hazardous materials, rescues, and public assists. The BCFD provides fire training for the Town's volunteer fire fighters.

9. El Medio Fire District

The El Medio Fire District used to provide fire protection services to the unincorporated area south of Oroville; however, the District stopped providing fire protection services on December 25, 2020. In conjunction with the City of Oroville, BCFD has agreed to provide fire protection services within the El Medio Fire District until an official agreement for services is completed.[13]

10. Fire Rating

The Insurance Service Office (ISO) collects information on municipal fire-protection efforts and rates individual communities as they compare to a nation-wide standard. The fire ratings range on a scale from Class 1 to Class 10, where Class 1 represents exemplary public protection, and Class 10 indicates that the area's fire-suppression program does not meet the ISO's minimum criteria. Those areas of Butte County that are within 5 miles of a fire station and within 1,000 feet of a fire hydrant or "recognized water system" have an insurance service office (ISO) rating of 4. Areas within 5 miles of a fire station but not within 1,000 feet of

[13] John Gaddie. Fire Captain, Butte County Fire Department. Personal communication with Angelica Garcia, PlaceWorks. February 25, 2021.

a recognized water system have an ISO rating of 8B. Areas that are not near a fire station or water system have an ISO rating of 10.

IV. COORDINATED CRIMINAL JUSTICE SYSTEM

City, town, county, State, and federal agencies provide criminal justice services in Butte County. These include, but are not limited to, the police agencies in the Cities of Chico, Oroville, Gridley, Biggs and the Town of Paradise, the Butte County Sheriff, the California Highway Patrol, the California Department of Fish and Wildlife (CDFW), the State Department of Parks and Recreation, and the U.S. Forest Service. However, in any case, this is simply the first part of the criminal justice system.

When arrests are made by any law enforcement agency or State agencies with Butte County, the arrestees are incarcerated in the County Jail, prosecuted by the County District Attorney's office, a court report is prepared by the County Probation Department, and in many cases, the County's Public Defender provides a legal defense to the defendant. Following trial, the County Probation Department also provides court-directed supervision to adults and juveniles. Also, the Corrections Division of the Sheriff's Office is mandated by law to provide for the care, safety, security, and welfare of persons incarcerated in Butte County correctional facilities. The Division provides transportation of inmates to court, medical and dental appointments, and state prisons.

In short, County Law Enforcement/Criminal Justice Services include general police response, investigation, and patrol services; special police operation unit services (e.g., emergency ordinance disposal team, special weapons and tactics team, canine unit, aviation unit, dive and rescue team, and narcotics task force); jail services; prosecution services; probation department services; and public defender services.

A. Butte County Sheriff-Coroner

The Butte County Sheriff's Office (BCSO) is responsible for law enforcement, criminal investigation, and crime prevention in the unincorporated areas of the county. The BCSO operates the County jail and Court security service. In addition to crime prevention and law enforcement services, the BCSO also functions as the County Coroner, and investigates suspicious, violent, accidental, and unattended deaths.

The BCSO is the county-wide coordinator for mutual-aid requests and responses. The BCSO has its main office in Oroville, with sub-stations in Chico and Magalia. The County jail can house 614 inmates and has an average daily population of 580 inmates. The BCSO responds to approximately 49,000 calls for service per year and the dispatch center receives about 186,000 calls per year.

BCSO personnel include the Sheriff, Deputy Sheriffs, Correction Deputies, Public Safety Dispatchers, detectives, and clerical staff. BCSO's Operations Division oversees the Special Weapons and Tactics Team, the Bomb Squad, the K-9 Program, the Marine Enforcement Unit, the Air Operations Unit, the Crime Prevention Unit, the School Resource Deputy program, Search and Rescue, the Sheriff's Team of Active Residents in Service, and a number other of volunteer programs.

The BCSO has designated area deputies that serve the outlying areas of the County.[14] Twenty-four-hour patrol service is provided. The patrol teams normally operate in response to specific incidents and have very limited time for non-directed patrol activities within the county.

B. Butte County District Attorney – Bureau of Investigations

The Butte County District Attorney's Office maintains a Bureau of Investigations which consists of 18 full-time peace officers as District Attorney Investigators. Besides providing follow-up investigations on crimes referred to the District Attorney by outside agencies, these investigators also do original county-wide investigations on child abuse and child abduction cases, investigate and arrest those who willfully do not pay their child support obligations; investigate and arrest those who commit fraud to obtain public assistance benefits; collect from those who pass insufficient fund checks; investigate and arrest those who commit fraud such as counterfeiting, embezzlement, insurance scams, worker compensation frauds and computer crimes; and investigate and arrest those who endanger their children by their narcotics activities.

[14] Butte County, 2020, Butte County Sherriff's Office Operations, https://www.buttecounty.net/sheriffcoroner/operations, accessed February 12, 2021.

C. Butte County District Attorney – Prosecution Bureau

The Butte County District Attorney's Office maintains a Prosecution Bureau, which is responsible for prosecuting felonies, misdemeanors, and juvenile cases. The Bureau consists of 30 full-time deputy district attorneys and includes specialized prosecutions and assignments to provide effective and prompt response to the needs of Butte County citizens.

D. Public Defender

The County's Public Defender Consortium is comprised of 19 consortium public defenders under contract with the County that provide legal assistance to indigent clients in criminal cases. Federal and State constitutions require the provision of competent counsel to those who are unable to retain a private attorney to defend him/herself.

E. Butte County Probation

The County Probation Department supervises convicted felons, both adults and juveniles, who are placed on probation by the court. The Department also prepares reports recommending sentencing after a conviction, operates the Juvenile Hall, manages the victim witness/assistance program, and participates in a variety of collaborative programs with schools, outside law enforcement agencies, County departments, and private agencies to prevent crime.

F. State Superior Court

The Butte County Superior Court is a separate governmental entity and its operational costs are funded entirely by the State of California and it is an integral part of the local criminal justice system.

G. California Highway Patrol

The California Highway Patrol (CHP) provides law enforcement services, primarily traffic control, for the State roads and roads in the unincorporated portions of the county. These services include traffic control, accident investigation, and licensing of vehicles. The CHP will respond when requested by the Sheriff.

The CHP has two offices to serve Butte County. The county is divided into north and south regions at the intersection of State Routes 99 and 149. The north district office, located in Chico, has 27 uniformed staff, including 22 officers, 4 sergeants, and 1 commander. Typical staffing has three units during the day and evening shifts, and one two-person unit during the graveyard shift. The north district office is also the dispatch center for the region. The CHP's south office, located in Oroville, has 21 officers, 3 sergeants, and 1 commander. The office has 13 vehicles in operation, with similar staffing as the north district office.[15]

The normal deployment/distribution of CHP personnel is based upon traffic volume and accident rates within the county. Areas with a high incidence of accidents or traffic control problems are patrolled on a regular basis. There are many areas of the county, particularly in the foothills, which are outside regular CHP patrols and visited only when called.

H. California Department of Fish and Wildlife

CDFW is responsible for protecting wildlife resources within the county. The Department has jurisdiction over all State, county, and municipal lands to enforce wildlife statutes. CDFW regional headquarters is located in Rancho Cordova. The officers operate out of their own home offices and establish their own hours, patrols, and focus for their activity. The CDFW officers in Butte County generally respond only to situations involving wildlife but can and do respond to public safety issues if they witness such violations or situations. They will also assist in emergency situations. Most of the officers have federal wildlife enforcement capability as well, since they are deputy marshals in the U.S. Fish and Wildlife Service.

I. California Department of Parks and Recreation

The California Department of Parks and Recreation is responsible for a number of parks within Butte County, including the Bidwell Mansion State Historic Park, the Lake Oroville State Recreation Area, the Bidwell-Sacramento River State Park and the Clay Pit State Vehicular Recreation Area. A number of rangers are employed at these various facilities. Park rangers are trained to enforce the laws and regulation of the State Park system, which may involve protecting plant and animal resources,

[15] Karen N. Perry, California Highway Patrol, personal communication with Angelica Garcia, PlaceWorks, February 18, 2021.

trespassing of prohibited areas, loaded firearms and hunting, fire, noise, vehicle use and travel, camping permits and refuse disposal.

J. Biggs Police Department

The City of Biggs has a contract with BCSO for police services. BCSO provides law enforcement officers 24 hours a day to the City of Biggs in addition to public safety dispatch services, records management, evidence and property management, and criminal investigation services. Previously, the City of Biggs contracted with the City of Gridley Police Department to provide law enforcement services; that contract expired in 2020.

K. Gridley Police Department

The Gridley Police Department is responsible for protecting the citizens and property in the City of Gridley. The Department operates one police station. The Department provides a variety of support services to the City of Gridley, including patrol services, dispatch, animal control, and graffiti abatement. The City of Gridley provides 24-hour emergency service. The Department receives approximately 3,000 911 calls per year and 16,000 calls for service.

L. City of Chico Police Department

The City of Chico Police Department covers a district that is approximately 33 square miles and serves the residents in the City of Chico. The Department is staffed by 140 employees and 100 police volunteers. The Department provides a Patrol Section, Special Operations Sections, Crisis Negotiation, Special Weapons and Tactics (SWAT), a Traffic Unit, Downtown Bicycle Patrol, and Neighborhood Watch.

M. City of Oroville Police Department

The City of Oroville Police Department has 4 sergeants and 16 officers that protect the City of Oroville. The Department provides community patrol and parking enforcement for the city. The Department also has a School Resource Officer and K-9 Unit.

N. Town of Paradise Police Department

The Town of Paradise Police Department has 49 employees that serve the Town of Paradise. The Department includes an Administration Division, Patrol, Investigations, Communication and Records, and Animal Control.

V. PUBLIC EDUCATION

The County Office of Education (BCOE); Butte Community College; California State University, Chico; and local school districts provide public education in the unincorporated area of Butte County. The local districts provide elementary and secondary education to the communities and unincorporated areas of the county, while the County Office of Education offers special education programs and other related services to the individual districts within the county. The Butte Community College is a two-year junior college that serves the residents of Butte and Glenn Counties with post-secondary and adult education.

A. Butte County Office of Education

The Butte County Office of Education provides local and regional educational programs, services, and support to the individual school districts within the county. The BCOE provides help to establish and maintain a consistent level of educational quality among the various school districts and serves as a link between the local districts and the requirements of State and federal education programs.

The BCOE offers a variety of programs and services for students and educators. The programs and services offered include administrative and organizational support, including fiscal services, personnel services, and data services; curriculum and staff support, including staff development, instructional support and curriculum development; and student services, including student activities and events, student welfare and related programs, migrant education, back to work program, and the mini corps program. In addition, the office operates the juvenile court schools, community schools, and a series of special service programs including vocational education, regional occupation, teenage parent education, and special education.

The office also provides a series of services to the State of California, including management information systems, policy assistance, and legal compliance programs.

B. Butte College

Butte College is a two-year community college that serves the residents of Butte and Glenn Counties. The college offers a range of liberal arts and career/technical classes through full-time, part-time, and evening programs. Founded in 1967, the college offered classes in Durham until it moved onto the current campus in 1974. Butte College offers over 180 degree and certificate programs for students. Many of the alumni have "careers in fire, nursing, law enforcement, welding, business, computer science, heavy equipment and more."[16] The College also offers guaranteed transfer degrees to California State Universities.

The main campus, located approximately 15 miles northwest of Oroville, is accessible to the communities of Oroville, Chico, Durham, Gridley, Paradise, and Magalia. The college also operates four satellite centers, three in Chico, and one in Orland in Glenn County. Approximately 928 acres in size, the main campus has training centers, ranging from law enforcement to agriculture and welding, as well as science and nursing academic laboratories.

Butte College enrollment grew from 842 students in 1967 to 13,145 students in the fall of 2015.[17]

C. California State University, Chico

California State University, Chico (CSU Chico) was established in 1887. Located in Chico, the campus serves Butte County and the region. CSU Chico has seven colleges (Agriculture; Behavioral and Social Sciences; Business; Communication and Education; Engineering, Computer Science, and Technology; Humanities and Fine Arts; and Natural Sciences), 5 schools, and 22 centers or institutes. The campus itself is 132 acres in size. In 2020, there were approximately 16,630 students, 951 instructional faculty, and 1,097 staff.[18]

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[16] Butte College, https://www.butte.edu/community/about/about/aboutus.html, accessed February 12, 2021.

[17] Butte College Snapshot, https://www.butte.edu/community/about/pba/documents/demographics/ButteCollegeSnapshot2014-2015.pdf, Page 13.

[18] California State University at Chico, https://www.csuchico.edu/about/chico-facts.shtml, accessed February 12, 2020, 2007.

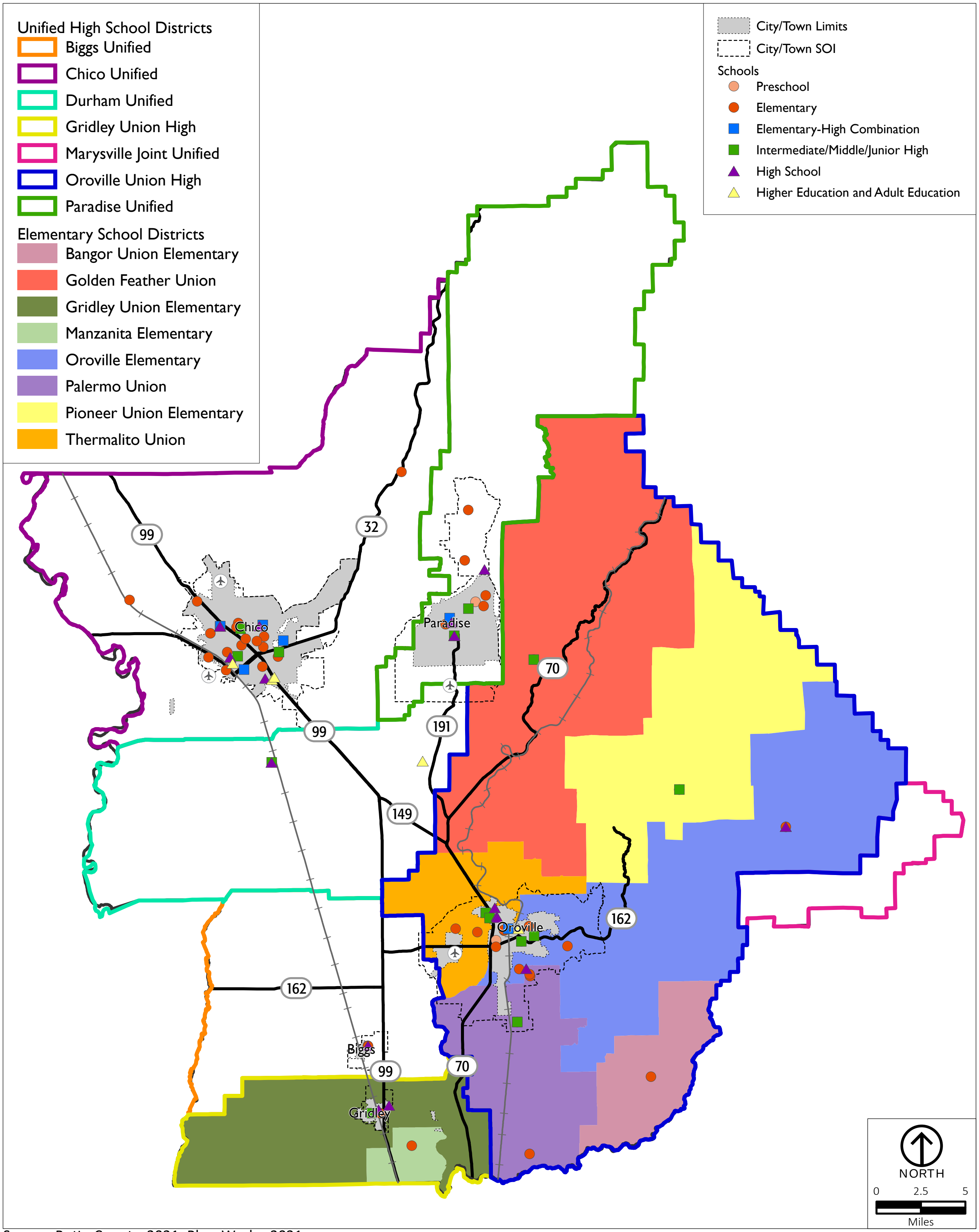
SU Chico is one of the CSU system's most popular campuses and has more qualified applicants than it can accommodate. The second-oldest campus in the CSU system, CSU Chico is a distance education trailblazer. CSU Chico was the first university in the world to offer a graduate degree via satellite. Students have won recent national awards in business, engineering, journalism, political science, and speech. CSO Chico is also known for its college-town atmosphere, top ratings from corporate recruiters, and high graduation rates.

D. School Districts within Butte County

The following school districts serve Butte County and are shown on Figure 7-2.

- Bangor Union Elementary School District
- Biggs Unified School District
- Chico Unified School District
- Durham Unified School District
- Golden Feather Union School District
- Gridley Unified School District
- Manzanita Elementary School District
- Oroville City Elementary School District
- Oroville Union High School District
- Palermo Union School District
- Paradise Unified School District
- Pioneer Union Elementary School District
- Thermalito Union Elementary School District

In addition to these listed school districts, a portion of the Marysville Joint Unified School District extends into Butte County, although it primarily serves residents of Yuba County. As shown on Figure 7-2, five of the districts (Biggs, Chico, Durham, Gridley, and Paradise) are unified school districts, providing elementary and secondary education. Seven districts (Bangor, Golden Feather, Manzanita, Oroville City, Palermo, Pioneer, and Thermalito) provide kindergarten through eighth grade education throughout the rest of the county, feeding students into Oroville Union High School District and Gridley Unified School District for secondary education.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE 7-2

SCHOOL DISTRICTS

There were 30,034 students enrolled in schools in Butte County for the 2019 to 2020 school year.[19] Enrollment has decreased since its peak of 35,304 students during the 1997-1998 school year.[20] The local school districts range in size from the single school, Golden Feather Union Elementary School District, which had a student enrollment of 53 students in 2019-2020,[21] to the Chico Unified School District, which had a student enrollment of 14,442 students for the same year.[22]

Special educational services are provided for those students with moderate to severe disabilities, emotional disturbances, and hearing disabilities. The Butte County Department of Education also offers an early education program to provide speech therapy, occupational therapy, and support for families with children below the age of three. Several schools also provide fee-based after-school programs and theme-based summer camps. The following sections provide more detail on the various school districts serving Butte County.

1. Bangor Union Elementary School District

The Bangor Union Elementary School District provides elementary education to the community of Bangor and the surrounding unincorporated county area south and east of Oroville. The District operates a single school, Bangor Elementary, ranging from kindergarten through eighth grade, and is approximately 40 square miles in area. The school had 103 students enrolled in the 2019-2020 school year.[23] Following eighth grade, Bangor students attend school in the Oroville Union High School District.

[19] Ed-Data Education Data Partnership, http://www.ed-data.org/county/Butte, accessed February 12, 2021.

[20] California Department of Education, http://data1.cde.ca.gov/dataquest/ASPGraph1.asp?Level=County&cName=BUTTE&cCode=04&cTopic=Enrollment&cLevel=County&cYear=2005-06&myTimeFrame=S&TheCounty=04,BUTTE&cChoice= TSEnr2, accessed December 26, 2006.

[21] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/enrethlevels.aspx?agglevel=District&year=2019-20&cds=0461457, accessed February 12, 2021.

[22] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/enrethlevels.aspx?cds=0461424&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021.

[23] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/, accessed February 12, 2021.

The Bangor Union Elementary School currently offers class sizes ranging from 14 to 23 students with one teacher and part time aide assistant in each class. The school provides campus-wide Wi-Fi services, and, for upper grade students, iPads or Chromebooks are available. The school also has a fully equipped computer lab.

2. Biggs Unified School District

The Biggs Unified School District provides elementary and secondary education to the City of Biggs and surrounding unincorporated county areas. The District is approximately 135 square miles in area and operates six schools, with a combined total enrollment of 605 students in the 2019-2020 school year.[24] The three schools that make up the District are:

- Biggs High School campus serves 196 students in grades ninth to twelfth. The High School was built in 1963 and has 17 classrooms, two science labs, one computer lab, a special education classroom, gym, and cafeteria/multi-purpose room. Improvements to the High School last year include remodeled restrooms and installation of video cameras for security.
- Biggs Elementary School serves 376 students from kindergarten through sixth grade. Biggs Elementary School has 19 teachers, one school counselor, a Speech and Language Pathologist, one English Language Development Teacher, and support staff. The school was combined with Biggs Middle School in 2011 to provide kindergarten to eighth grade education. The school renovated their quad building, three classrooms, and five restrooms in the past year.
- Richvale Elementary School has a total enrollment of 33 students from first through sixth grade. The school has three classrooms and other facilities, including a full-sized gymnasium with a stage and a cafeteria. Recent facility improvements include installation of security cameras, safety signage, and replacement of classroom and gym doors. The District will be working to modernize each school site to ensure that the facilities remain in good repair.

3. Chico Unified School District

The Chico Unified School District provides elementary and secondary education to residents of the City of Chico and surrounding unincorporated areas. The District serves an area of approximately 322 square miles and operates 23 schools with a combined total enrollment of 14,442 students in the 2019-2020 school year. The

[24] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/enrethlevels.aspx?cds=0461408&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021.

District has 12 elementary schools with grades K-6 (Chapman, Citrus, Emma Wilson, Hooker Oak, Little Chico Creek, Marigold, McManus, Neal Dow, Parkview, Rosedale, Shasta, and Sierra View), three junior high schools with grades 6-8 (Bidwell, Chico, Marsh, and the Academy for Change), Chico Country Day School serves grades K-8, and three senior high schools with grades 9-12 (Chico, Pleasant Valley, and Fairview Continuation). The District also has four preschool programs, one online learning academy and independent study program, one community day school, and one special education services school.

The District has accommodated continued growth in enrollment by changing school boundaries, reusing existing facilities, modifying existing facilities, allowing intra-district student transfers, constructing new facilities, and using leased portable facilities. The District prepared a Facilities Master Plan in 2014 to address student population growth, technology needs, academic programs, access and code compliance, and maintenance. The Facilities Master Plan was updated in 2019 to address the impact of the 2018 Camp Fire as well as the need for additional capacity due to an increase in housing development. The goal of the plan is to maximize the use of District bond funds to benefit the facilities with the most need.

4. Durham Unified School District

The Durham Unified School District provides elementary and secondary education to 186 square miles that include Durham and the surrounding area. The District operates three schools, Durham Elementary School (K-5), Durham Intermediate School (6-8), and Durham High School (9-12), with a combined total enrollment of 1,053 students in the 2019-2020 academic year.[25] The Durham Unified School District experienced its peak enrollment in 2000-2001, with 1,362 students.

On November 6, 2018, voters in Butte County approved a bond measure to allow funding for facility and equipment updates. Since then, the District has begun to replace roof HVAC units and complete other electrical and roofing upgrades to each school. In 2019, the District completed a Facilities Planning Assessment to evaluate the conditions of the District's school facilities. The assessment identified a cost estimate to modernize and upgrade the facilities, as well as potential funding sources.

25 California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/enrethlevels.aspx?cds=0461432&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021.

5. Golden Feather Union Elementary School District

The Golden Feather Union Elementary School District provides elementary education to approximately 221 square miles of unincorporated county lands to the north and west of Lake Oroville. The District operates two elementary schools, Concow Elementary School (K-8) and Golden Feather Community Day School (K-8). The Concow Elementary School had a student enrollment of 53 students during the 2019-2020 school year.[26] The Golden Feather Community Day School does not currently have any students enrolled. Following eighth grade, Golden Feather students attend school in the Oroville High School District.

According to the 2018-2019 School Accountability Report Card (SARC), the Concow Elementary School site needs new playground equipment and air conditioning units.[27] The restroom stalls and drinking fountains also need upgrades.

6. Gridley Unified School District

The Gridley Unified School District offers elementary and secondary education to residents of Gridley and the surrounding areas. The District is approximately 87 square miles in size and operates McKinley Primary School (K-1), Wilson intermediate Elementary School (2-5), Sycamore Middle School (6-8), Gridley High School (9-12), and Esperanza Continuation High School (11-12). The District's total combined student enrollment for the 2019-2020 school year was 2,087.

Gridley High School rents the Farmer's Hall from Butte County's fairgrounds to serve as a gym for the high school. Priority facility improvements for the high school include renovating the locker room areas and classrooms. In 2019, five portable classrooms were replaced, and new landscaping was completed at Sycamore Middle School. New permanent buildings with six classrooms were constructed in 2018 at Wilson Elementary School. The Esperanza Continuation High School underwent a remodel recently that included installing new offices, fixing roof leaks, sealing floors, and repairing HVAC units. According to the 2020-2021 SARC, the classrooms at McKinley Primary School are below State square

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[26] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/enrethlevels.aspx?agglevel=District&year=2019-20&cds=0461457, accessed February 12, 2021.

[27] Concow Elementary School, School Accountability Report Card 2018-19. https://sarcprodwest.blob.core.windows.net/sarc-pdfs/SarcPdfs/11/04614576003131.pdf, page 8.

footage standards and only seven of the portable classrooms have running water.[28] The school's accountability report card does not identify plans to upgrade the classrooms to meet State standards.

7. Manzanita School District

The Manzanita School District provides elementary education to the residents of Gridley in the southern area of the city. The District covers approximately 11 square miles and operates a single school, Manzanita Elementary School, with a total student enrollment of 296 students in grades K-8 for the 2019-2020 school year.[29] Following eighth grade, Manzanita students attend school in the Gridley Unified School District. According to the 2018-2019 SARC, the school's facilities are up to date.[30]

8. Oroville City Elementary School District

The Oroville City Elementary School District offers elementary education to residents of Oroville and the unincorporated county areas east and south of the city. The District is approximately 78 square miles in size and operates one pre-school, four elementary schools, and two middle schools, as follows:

- Sierra del Oro, Pre-school
- Oakdale Heights Elementary School, K-5
- Ophir Elementary School, K-5
- Stanford Avenue Elementary School, K-5
- Wyandotte Academy School, K-5
- Central Middle School, 5-8
- Ishi Hills Middle School, 6-8

[28] Mckinley Primary School, School Accountability Report Card 2018-19. http://www.gusd.org/documents/2020%20SARC/2020%20McKinley%20SARC.pdf, page 4.

[29] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/EnrEthLevels.aspx?cds=04614996003198&agglevel=School&year=2019-20, accessed February 12, 2021.

[30] Manzanita Elementary School, School Accountability Report Card 2018-19. https://sarcprodwest.blob.core.windows.net/sarc-pdfs/SarcPdfs/11/04614996003198.pdf, page 4.

The seven schools have a combined student enrollment of 2,739 students in the 2019-2020 school year.[31] Following eighth grade, students attend the Oroville Union High School District. Ishi Hills Middle School is the only school that reported facility improvements per the school's most recent student accountability report cards. In 2017, a water line and valve were installed at Ishi Hills Middle School to provide water for sprinklers. The school is in the design stage for a new running track and pickle ball courts.

9. Oroville Union High School District

The Oroville Union High School District offers secondary education to a 723-square-mile area that includes Oroville and surrounding unincorporated county areas. The District operates two high schools, one continuation school, one adult education school, and one community day school, as follows:

- Las Plumas High School
- Oroville High School
- Prospect Continuation High School
- Oroville Adult Education Career and Technical Center
- OUHSD Community Day School

These schools had a combined enrollment of 2,237 students in the 2019-2020 school year.[32] Oroville High School upgraded a number of their school facilities over the years. The high school has a new library, science wing, and industrial arts building. The old library was converted into a theater and performance arts center. The high school also has new softball and baseball fields. According to the 2019-2020 SARC, the high school only needs minor repairs.[33] Las Plumas High School has several classrooms that need minor improvements, including new ceiling tiles.

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[31] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/enrethlevels.aspx?cds=0461507&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021.

[32] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/enrethlevels.aspx?cds=0461515&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021.

[33] Oroville High School, School Accountability Report Card 2019-20. https://www.ouhsd.org/Page/1631, page 9.

10. Palermo Union Elementary School District

The Palermo Union Elementary School District provides elementary education to approximately 67 square miles of unincorporated county territory to the south of Oroville. The District operates five schools: Helen Wilcox (K-4, Day Care Center), Golden Hills Elementary (4-5), Honcut Elementary (K-3), Palermo Middle School (6-8), Palermo Union Community Day School (K-8).

The District had a combined student enrollment of 1,334 for the 2019-2020 school year.[34] Following eighth grade, Palermo students attend school in the Oroville High School District.

As a result of overcrowding in the Palermo and Helen Wilcox schools, the District built the Golden Hills Elementary School in 2006. The school provides 12 classrooms, a multipurpose room, library, and an administration building. Palermo Middle School maintenance improvement projects for the 2020-2021 school year include installation of hand sanitizers and hand washing stations, installation of a school doorbell, and new locked entrance to control on-site traffic.[35] Facility improvements for the other schools were not identified in the school's SARC.

11. Paradise Unified School District

The Paradise Unified School District provides elementary and secondary education to a 220-square-mile area that includes Paradise and unincorporated areas north to Tehama and Plumas Counties. The District operates 12 schools and programs as follows:

- ♦ Cedarwood Elementary School, K-6
- ♦ Pine Ridge School, K-6
- ♦ Paradise Ridge Elementary School, K-6
- ♦ Ponderosa Elementary, K-5 (currently closed as a result of the 2018 Camp Fire)

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[34] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/enrethlevels.aspx?cds=0461523&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021.

[35] Palermo School, School Accountability Report Card 2019-20. https://core-docs.s3.amazonaws.com/documents/asset/uploaded_file/1103253/19-20_Palermo_SARC.pdf, page 5.

- Paradise Intermediate School, 7-8 (currently operating at Paradise High School as a result of the 2018 Camp Fire)
- Paradise High School, 9-12
- Ridgeview High School, 10-12
- Paradise eLearning Academy, 9-12
- Honey Run Academy, 7-12 (currently closed as a result of the 2018 Camp Fire)
- Cedarwood Children's Center, Pre-School
- Pine Ridge, Pre-school
- Pearson Center, Post-Secondary Special Education

District enrollment in 2019-2020 was approximately 2,222.[36] Enrollment in the District has declined as a result of the 2018 Camp Fire. On April 21, 2020, the District revised the Facilities Master Plan to identify priority improvements for school facilities damaged by the fire. The plan shows the layout for the new Ridgeview High School and location of improvements for other schools. Phase 1 improvements include building a new continuation high school (Ridgeview High School), building a new transportation and food service facility, rebuilding Paradise High School, and building a new multi-purpose room and administration building at Ponderosa. Phase 2 improvements include modernizing classrooms, demolishing portables and replacing them with permanent facilities, and adding new science, technology, engineering, the arts and mathematics (STEAM) classroom buildings at several schools. Other upgrades include new fencing, painting, and a stadium remodel at Paradise High School.[37]

12. Pioneer Union Elementary School District

The Pioneer Union Elementary School District operates Berry Creek Elementary School and provides elementary education to the residents of the communities of Berry Creek, Brush Creek, and surrounding areas to the north and east of Lake Oroville. The District is approximately 129 square miles in area.

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[36] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/EnrEthLevels.aspx?cds=0461531&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021.

[37] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/EnrEthLevels.aspx?cds=0461531&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021

Berry Creek Elementary School had 56 students in grades K-8 during the 2019-2020 school year.[38] The Berry Creek Elementary and Pioneer Elementary School District facilities were destroyed during the 2020 North Complex Fire. The District is currently working with their insurance and FEMA to rebuild.

13. Thermalito Union Elementary School District

The Thermalito Union Elementary School District provides elementary education to the community of Thermalito and surrounding county areas to the west of Oroville. Combined enrollment in District schools was 1,550 students in 2019-2020.[39] The District has a large population of students who do not speak English as a first language and operates a number of special programs to serve the needs of these students. Following eighth grade, Thermalito students attend school in the Oroville Union High School District.

The District operates four conventional schools, one day school, and a home study and after school program.[40] Each conventional school is listed below:

- Poplar Avenue School, K-5
- Sierra Avenue School, K-5
- Plumas Avenue School, K-5
- Nelson Avenue Middle School, 6-8

Several facility upgrades were completed over the past years at Plumas Elementary School. The school was repainted, several classrooms were recarpeted and retiled, iron fence gates were installed, the front parking lot was extended, and a new playground was installed. In 2020, the school received siding material to apply on the outer classroom walls. Poplar Avenue Elementary School installed a new playground in 2018. No further upgrades or improvements were identified for schools in the District in the SARC.

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[38] Paradise Unified School District, April 2020, PUSD Facility Master Plan, http://www.pusdk12.org/documents/Maintenance%20and%20Operations/PUSD_Facility_Master_Plan_04-21-20.pdf, accessed February 12, 2021.

[39] California Department of Education, https://dq.cde.ca.gov/dataquest/dqcensus/EnrEthLevels.aspx?cds=0461531&agglevel=district&year=2019-20&ro=y, accessed February 12, 2021.

[40] Thermalito Union School District: http://www.thermalito.org/ default.htm, accessed February 13, 2021.

VI. SPECIAL DISTRICTS

Special districts are a form of local government created by a local community to meet a specific need. Inadequate tax bases and competing demands for existing taxes make it hard for cities and counties to provide all the services their citizens desire. When residents or landowners want new services or higher levels of existing services, they can form a district to pay for and administer them. According to the California Special Districts Association, "Most Californians don't understand special districts. Most of us don't know:

- ♦ How many exist (about 3,300);
- ♦ What they do (services from A to Z: airports to zoos);
- ♦ Who runs them (it could be your next-door neighbor);
- ♦ Or even what they spend on local services (about $38 billion a year);

Celebrated as the best example of democracy, cursed as the worst form of fragmented government, and generally misunderstood even by the experts, special districts are California's unique contribution to local government. The question remains: *What's so special about special districts?* The answer: **focused service**.

Focused because special districts only serve in specifically defined areas, unlike counties and cities that provide services throughout their boundaries. Special districts are also ***focused*** because most of them provide only a single service, allowing them to concentrate on one activity. ***Service*** because districts deliver only the public programs and public facilities that their constituents want. Counties and cities provide multiple programs, some of them mandated by the federal and State governments. Special districts provide the public services that the public wants.[41]

For more information about Special Districts, visit http://www.csda.net. For more information about Special Districts in Butte County, visit the LAFCO website at: http://www.buttelafco.org/agencies/special-districts.

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[41] California Association Local Agency Formation Commissions. What's So Special About Special Districts? Citizens' Guide to Special Districts. https://calafco.org/sites/default/files/resources/Whats_So_Special.pdf, page 3.

Specific to Butte County, the following is a list of Special Districts, city providers, and other entities that provide of a variety of services:

1. Water

- South Feather Water and Power Agency
- Paradise Irrigation District
- Durham Irrigation District
- Lake Madrone Water District
- Berry Creek Community Services District
- California Water Service Company – Chico District
- California Water Service Company – Oroville District
- Thermalito Irrigation District*
- City of Gridley*
- City of Biggs*

2. Sewer

- Lake Oroville Area Public Utility District
- Richardson Springs Community Services District
- City of Chico
- City of Oroville
- Richvale Sanitary District
- Sewerage Commission – Oroville Region
- Thermalito Water & Sewer District*
- City of Gridley*
- City of Biggs*

* Sewer and water provider.

3. Drainage

- Drainage District No. 1
- Drainage District No. 2
- Drainage District No. 100
- Drainage District No. 200
- Butte Creek Drainage District

4. Irrigation

- South Feather Water and Power Agency
- Durham Mutual Water Company
- Biggs-West Gridley Water District
- Butte Water District
- Western Canal Water District
- Richvale Irrigation District

5. Reclamation

- Rock Creek Reclamation District
- Sacramento River Reclamation District
- Reclamation District No. 833
- Reclamation District No. 2054
- Reclamation District No. 2056

6. Recreation/Parks

- Chico Area Recreation and Park District
- City of Chico Park Department
- Paradise Recreation and Park District
- Feather River Recreation and Park District
- Durham Recreation and Park District
- City of Oroville Parks and Trees Department
- Richvale Recreation and Park District
- Biggs Swimming Pool District
- Gridley Swimming Pool District
- City of Biggs Park Services
- City of Gridley Recreation Department

7. Mosquito Abatement

- Butte County Mosquito and Vector Control District
- Durham Mosquito Abatement District
- Oroville Mosquito Abatement District

8. Cemetery

- Bangor Cemetery District
- Gridley-Biggs Cemetery District
- Kimshew Cemetery District
- Oroville Cemetery District
- Paradise Cemetery District
- Pine Creek Cemetery District
- Stirling City Cemetery District
- Thompson Flat Cemetery District
- Upham Cemetery District
- Wyandotte Cemetery District

9. Butte County Resource Conservation District

The Butte County Resource Conservation District is governed by a five-member Board of Directors made up of ranchers, local landowners, and farmers. The Board of Directors are appointed by Butte County Board of Supervisors to protect and support the county's natural resources and agriculture.

Butte County Special Districts are part of the statewide association. For more information, you can visit http://buttelafco.org/agencies/special-districts.

VII. Quasi Governmental Agencies and Joint Powers Authorities (JPA) in which the County participates

This is a brief listing of other entities in which Butte County participates:

- BCAG[42] – The Butte County Association of Governments (BCAG) is an association of all the local governments within Butte County. Its members include the cities of Biggs, Chico, Gridley, and Oroville; the Town of Paradise; and the County of Butte.

  BCAG is responsible for development of federal and State transportation plans and programs that secure transportation funding for the region's highways, transit, streets and roads, pedestrian and other transportation system improvements. BCAG is currently preparing the Post Camp Fire Regional Population & Transportation Study to study the regional housing, population,

[42] Butte County Association of Governments, *http://www.bcag.org*, accessed February 13, 2021.

employment, and traffic patterns before and after the 2018 Camp Fire. The study will inform the 2024 Regional Transportation Plan/Sustainable Communities Strategy.

- LAFCO[43] – The Local Agency Formation Commission (LAFCO) is a state-mandated local agency that oversees boundary changes to cities and special districts, the formation of new agencies including incorporation of new cities, and the consolidation of existing agencies. The broad goals of the agency are to ensure the orderly formation of local government agencies, to preserve agricultural and open space lands, and to discourage urban sprawl.

- AVA – Butte County, as a *jurisdictional* member of the Butte County Abandoned Vehicle Abatement (AVA) Program Service Authority encompassing the unincorporated areas of Butte County, began towing abandoned vehicles in December 2003. Funds for the AVA program are generated from a one dollar registration fee collected by the State of California. The Butte County AVA Service Authority was established to ensure "the removal of abandoned vehicles are conducted in a manner most consistent with the good of the general public."[44] The Service Authority is composed of one member from each jurisdiction and includes one representative from the County.

- City of Chico/Butte County Nitrate JPA – In 1979 high levels of nitrates were discovered by the State Department of Water Resources in parts of the Chico Urban Area. To deal with the nitrate issue, the Regional Water Quality Control Board issued a Prohibition Order in 1990 which prohibited the use of septic systems in parts of the Chico Urban Area. The Chico Urban Area Nitrate Compliance Plan was adopted in 2000 to address the nitrate issue. Since that time, the County and the City of Chico have taken several steps toward implementing the Nitrate Compliance Plan. To fund necessary sewer improvements within the Greater Chico Urban Area, the County and the City of Chico applied for the State Revolving Loan Fund to secure financing for sewer improvements. The State Water Resources Control Board granted the loan and construction work to install sewer lines has begun. This sewer project is separated into six project phase areas. As of April 23, 2014, the first

[43] Butte Local Agency Formation Commission, *http://www.buttelafco.org*, accessed February 13, 2021.

[44] Butte County, Abandoned Vehicle Abatement Service Authority (AVA), *https://www.buttecounty.net/dds/Meetings/AVA*, accessed February 13, 2021.

three phases were complete and work began on the fourth phase. According to the County's website, further time and capital resources are needed to complete this project. For more information on the Chico Urban Area Nitrate Compliance Plan, please visit:

https://www.buttecounty.net/administration/Nitrate-Compliance-Program

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8 RECREATION

A. Introduction

A wide range of recreational facilities and recreational programs are found in Butte County, offering numerous recreational opportunities to local residents and visitors. Most public recreational facilities and parks in the unincorporated County are owned and/or managed by one of five large independent special districts, or by various local, State and federal agencies, sometimes in joint arrangements. Others, including some facilities located within the incorporated jurisdictions, are owned and managed by the municipalities themselves. Privately-owned, commercial facilities such as campgrounds, golf courses, and bowling alleys also provide an important range of recreational and leisure activities. This chapter describes all of these various types of recreational facilities in Butte County.

B. Regulatory Setting

Parks and recreational open space are the most significantly regulated types of recreation facility. Provision of parks is generally regulated through parks planning standards, which set forth requirements for dedication of open space, or payment of in-lieu fees, in conjunction with new development.

In 1996, the National Recreation and Park Association (NRPA) published the *Park, Recreation, Open Space and Greenway Guidelines*. In addition, the NRPA has published best practice guidelines for planning, designing, and implementing green infrastructure in parks, financing green infrastructure projects, and safe routes to parks as well as other resource guidelines that can be used as reference by recreation planning agencies. The guidelines are used by many recreation planning agencies as a guide to develop their own standards for their service areas. These national standards serve as a guideline for measurement and are not designed to be considered absolute requirements. The dynamic population characteristics of a particular park district or local jurisdiction will require a certain amount of subjective analysis and professional experience to quantify and use these standards (or some modification thereof) for effective planning. For this reason, the five major recreation districts in Butte County have their own standards to measure and plan for the recreation demand in their service areas.

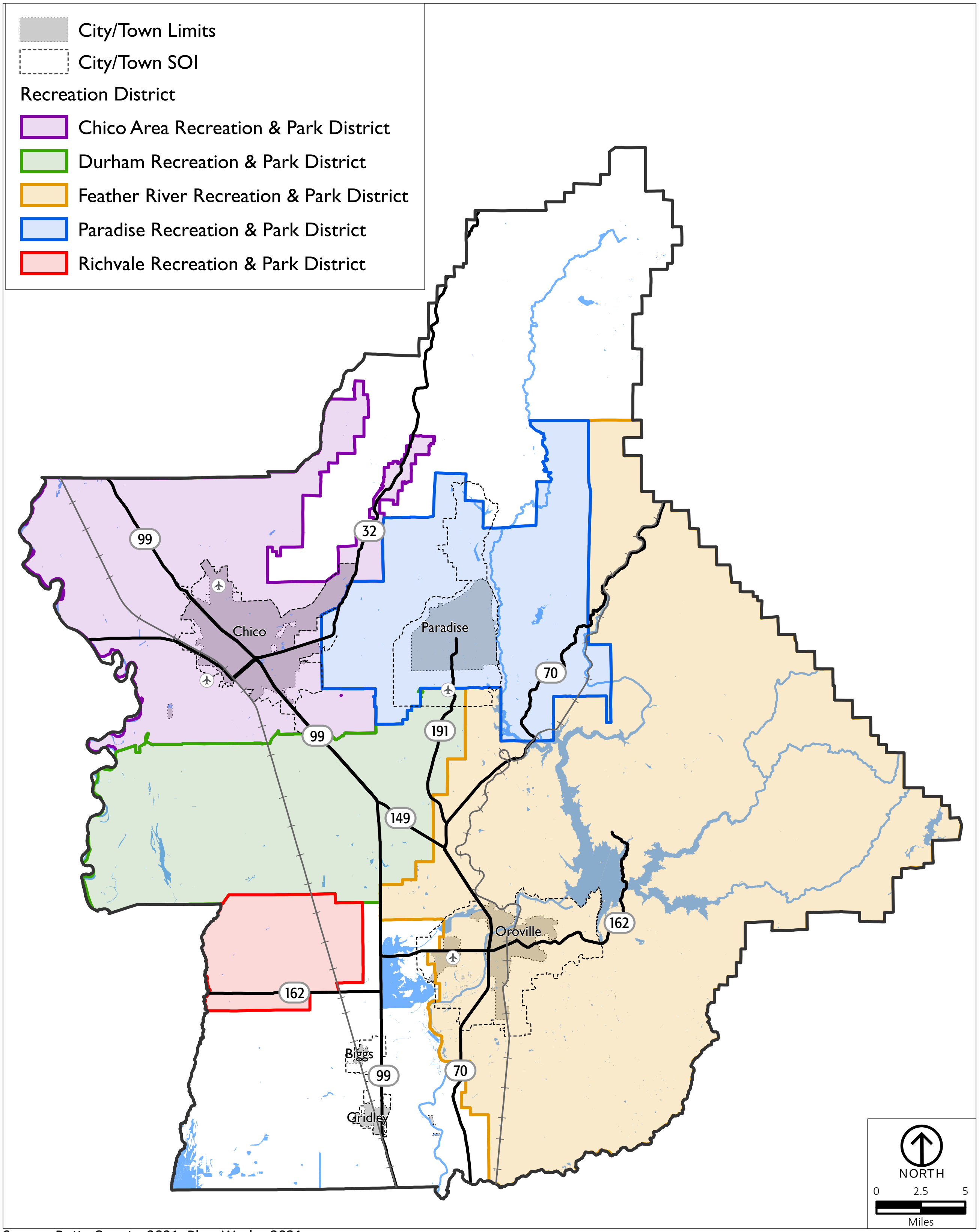
The following sections provide an overview of the various recreation districts that operate parks and facilities in the county and the park planning standards they utilize, and presents information on park planning standards, as established by the special recreation districts in Butte County.

1. Butte County

The existing Public Facilities and Services Element of the General Plan supports a comprehensive and high-quality system of recreational open space and facilities. Policies to achieve this goal include reviewing development proposals to designate sites for new parks and recreation facilities and allowing a density increase when parks are incorporated into certain development projects. The existing General Plan does not identify a parkland ratio standard because the County does not actively maintain any parks or recreation facilities. As previously noted, the majority of park and recreational facilities in unincorporated Butte County are owned and operated by the special districts, the boundaries of which are described herein, and which include unincorporated as well as City land. Fees for these districts are assessed for district residents when a facility is developed or improved and those facilities are provided as a public benefit to County residents.

2. Special Districts

Five large special independent districts maintain many of the parks and recreational facilities in Butte County. These districts, which encompass most of the county's land area, operate as "independent" districts, meaning that each district is governed by a board of directors elected by the voters in that district. The districts in Butte County are also non-enterprise districts, meaning that they depend mainly on property taxes for operating revenue, rather than user fees. In addition to the five main districts, two small swimming pool districts in Gridley and Biggs own and maintain community swimming pools there. The various districts in the county, and their adopted parks planning standards, are described below. The boundaries of the districts are illustrated in Figure 8-1.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE 8-1

RECREATION DISTRICTS

a. Chico Area Recreation and Park District

The Chico Area Recreation and Park District (CARD) is centered around the City of Chico, and extends north to the Tehama County boundary, encompassing approximately 225 square miles. CARD serves approximately 130,000 residents; 90 percent of the population within the district is found in the urbanized area in and around Chico. Although CARD's land area is not the largest, it owns and operates the greatest number of parks and facilities of any special district in the county. CARD uses the NRPA standards as a guideline and has adopted its own standards in its master planning effort.

CARD adopted the Park and Recreation Master Plan in 2008, which established a parkland target of 1.5 acres of neighborhood parkland per 1,000 residents and 2.5 acres of community parkland per 1,000 residents. In 2019, CARD updated the Park and Recreation Master Plan, but maintained that parkland standard. According to the City of Chico General Plan, one or two community parks and 7 to 14 neighborhood parks are needed to accommodate the anticipated service area population by 2030. The updated Master Plan identifies potential locations for new neighborhood parks and recognizes the need for new community parks. The City of Chico recently published a development impact fee nexus study to evaluate improvement needs to support the city's growth and development through 2040. The City has not yet provided the results of this study to the Board of Supervisors to request adoption of fee changes to be applied to the unincorporated county.

b. Feather River Recreation and Park District

The Feather River Recreation and Park District (FRRPD) is centered around Oroville and extends the length of the eastern portion of Butte County, including the City of Oroville and Lake Oroville, Bangor and surrounding rural areas. FRRPD's boundary is approximately 735 square miles and serves a population of approximately 51,455 people. Other communities served by FRRPD include Palermo, Honcut, and the mountain areas of Feather Falls, Berry Creek, and Forbestown. The FRRPD uses the NRPA standards for evaluating park type and minimum acreage to meet the needs of the community.

FRRPD has a Parks Master Plan that was updated in 2020. FRRPD uses the 2020 Parks Master Plan as a resource to inform decision making regarding park facilities in the district. The Master Plan outlines the condition of existing park facilities and provides recommendations to address future park needs for each of the communities served by FRRPD. The Master Plan also includes a service area map, which identifies the location of future community and neighborhood parks. Per the Master Plan, the FRRPD Master Plan Ad-Hoc Committee is required to initiate an annual review of the Plan to ensure it meets the park needs of the district and community. FRRPD is currently in the process of completing an update to the Master Plan for 2030.

c. Paradise Recreation and Park District

The Paradise Recreation and Park District (PRPD) serves the upper and lower Paradise Ridge area, including areas to the east and west, centered around the community of Paradise. Prior to the 2018 Camp Fire, PRPD's land area encompassed approximately 169 square miles and had a service population of approximately 41,100 persons. PRPD also managed approximately 456 acres of park land and recreational facilities, of which, only 75 acres were partially or fully developed.

In partnership with PRPD, the Conservation Biology Institute and the Nature Conservancy completed the Paradise Nature-Based Fire Resilience Project final report in June 2020. The report describes a method of increasing resiliency to fire risks by incorporating wildfire risk-reduction buffers between the wildlands and urban areas. The report recommends five wildfire risk buffer areas around Paradise, Magalia, and Concow-Yankee Hill. PRPD's 2016-2024 Master Plan has a goal of providing 5 acres of developed park land per 1,000 people. As of 2016, PRPD had about 2 acres of developed park land per 1,000 people in the district.

d. Durham Recreation and Park District

The Durham Recreation and Park District (DRPD) service area is located south of Chico and contains the communities of Durham, Dayton, and Nelson. The District boundaries are coterminous with the CARD southern boundary and the Glenn County boundary on the west. It encompasses approximately 220 square miles and serves an estimated population of 5,000 persons.

DRPD uses a ratio of 6.4 acres per thousand persons, based on the 2014-2024 Master Plan. Facility improvements identified in the Master Plan include one gym or multi-purpose facility, one indoor basketball and volleyball court, two new baseball fields, one soccer field, and at least one new community center.

e. Richvale Recreation and Park District

The Richvale Recreation and Park District (RRPD) serves the community of Richvale and its surrounding area, encompassing over 36,000 acres. As of 2007, RRPD served an estimated population of 640 persons. RRPD maintains two acres of parkland on land shared with the Richvale Elementary School. The district has historically held an agreement with Biggs Unified School District to maintain and improve the facilities at the Richvale Elementary School. Under this agreement, the facilities would be accessible to Butte County residents.

f. Gridley and Biggs

No special recreation and park district serves either the Gridley or Biggs areas; however, two small Community Service Areas operate swimming pools that serve these communities. The pools are owned by Butte County and managed by Biggs Unified School District in Biggs and the Fairgrounds in Gridley. The Cities of Biggs and Gridley have parkland goals of 5 acres each per 1,000 residents. The City of Biggs was approximately 3.5 acres short of meeting their parkland needs in 2013. However, the City exceeded the parkland ratio when they included joint-use facilities. In 2013, the City of Biggs estimated an additional 8.65 acres of parkland would be needed by 2030 to maintain their parkland standard based on the projected population growth. In 2015, Gridley had sufficient parkland to meet their standard. As of 2010, the City of Gridley had 3.1 acres of developed parkland per 1,000 residents.

C. District, City, County and Local Agency Parks and Recreation Facilities

This section describes the parks and recreation facilities in Butte County that are variously owned and/or operated by special districts, local cities and towns, Butte County, and other local agencies such as school districts. Although facilities under all of the above jurisdictions are discussed here, the chapter uses the boundaries of the recreation districts as a framework to organize the section geographically. These boundaries are shown in Figure 8-1.

1. Chico Area

Facilities encompassed within the geographic area of the Chico Area Recreation District, including those within the City of Chico and surrounding area, are owned and operated variously by the Chico Area Recreation District, the City of Chico, and other local entities, including CSU Chico and the Chico Unified School District. One of the most notable recreational amenities in this area is 3,600-acre Bidwell Park, owned by the City of Chico and one of the largest city parks in the entire country. Other large parks include the 40-acre CARD Community Park, and the city-owned Hooker Oak Recreation Area. Many other smaller parks are owned and operated by the City and by CARD. School district operated facilities include a number of ballfields and athletic fields. A complete listing of facilities in the Chico area is provided in Table 8-1 (all tables are located at the end of this chapter).

2. Oroville Area

Recreation facilities within the geographic area of the FRRPD are owned and operated by various local agencies, including the FRRPD, the City of Oroville, and by the several school districts located within this area. Significant among these are the 210-acre Riverbend Park, a FRRPD-owned facility along the Feather River in Oroville; the Nelson and Nolan Softball Complex, also in Oroville; and the Forbestown Park, which serves the Forbestown area. Numerous other smaller parks, offering a variety of active and passive recreational opportunities, are located throughout the area, serving neighborhoods in the City of Oroville and other population centers. Local area schools also house many recreation resources. A complete listing of facilities in the Oroville area is provided in Table 8-2.

Perhaps the most prominent recreational resource in the Oroville Area is Lake Oroville. This important amenity, which is managed by the State of California, is discussed later in this chapter.

3. Paradise Area

The recreation facilities within the geographic area of the Paradise Area Recreation and Park District, including those within the Town of Paradise and the surrounding area, are owned and operated variously by the Paradise Area Recreation and Park District, the Town of Paradise, and other local entities, including the Paradise Unified School District. Included among these facilities are the 367-acre Coutolenc Park in Magalia, the 204-acre Paradise Lake, and the Paradise Memorial Trialway, a 4-mile paved trail along the old railroad line in Paradise. The Paradise Area Recreation and Park District maintains about 73 acres of developed park land and 358 acres of natural open space. Recreation facilities in the Paradise area were impacted by the 2018 Camp Fire and 2020 North Complex Fire. As a result of the wildfires, the Paradise Area Recreation and Park District is considering incorporating wildfire risk reduction buffers around Paradise, Magalia, and Concow-Yankee Hill. A complete listing of facilities in the Paradise area prior to the 2018 Camp Fire is provided in Table 8-3.

Another significant recreational resource in the Paradise area is a system of nature trails. This amenity is owned and managed by the Bureau of Land Management and spans over 120 acres on State land. In January 2021, the Paradise Recreation and Park District secured a grant from the State Recreational Trails and Greenways Grant program to fund a new multi-use, 15-mile trail linking Magalia and Paradise Lake and extending a portion of the Butte County Railway trail. There is also a master plan for a new 26-acre park on the land east of Lakeridge Circle. For more information about these trails and other facilities operated by the State of California, refer to Section D.2.

4. Durham Area

Facilities within the geographic area of the Durham Recreation and Park District, including those within the community of Durham and surrounding area, are owned and operated by the Durham Recreation and Park District, and other local entities, such as the Butte-Glen Community College District and the Durham Unified School District. The most prominent amenity in the Durham area is Butte Community College, which provides 234 acres of recreational land, with facilities that include sport courts and athletic fields. A complete listing of facilities in the Durham area is provided in Table 8-4.

5. Richvale Area

As previously mentioned, recreational facilities within the geographic area of the Richvale Recreation and Park District are limited. The Richvale Recreation and Park District maintains 2 acres of parkland on land shared with the Richvale Elementary School. The park contains basketball courts, tennis courts, a recreation room, a picnic area, and softball fields. The district has historically held an agreement with Biggs Unified School District to maintain and improve the facilities at Richvale Elementary School.

6. Gridley and Biggs Area

Recreation facilities within the geographic area of the community service areas for Gridley and Biggs, including those within the cities and the surrounding areas. Two recreational amenities in this area are the Olympic-sized swimming pool in Gridley and the community swimming pool in Biggs, which are owned by the County and operated by the Gridley Fairgrounds and the Biggs Unified School District, respectively. A complete listing of facilities in the Gridley and Biggs area is provided in Table 8-5.

D. Federal and State Parks, Campgrounds, and Reserves

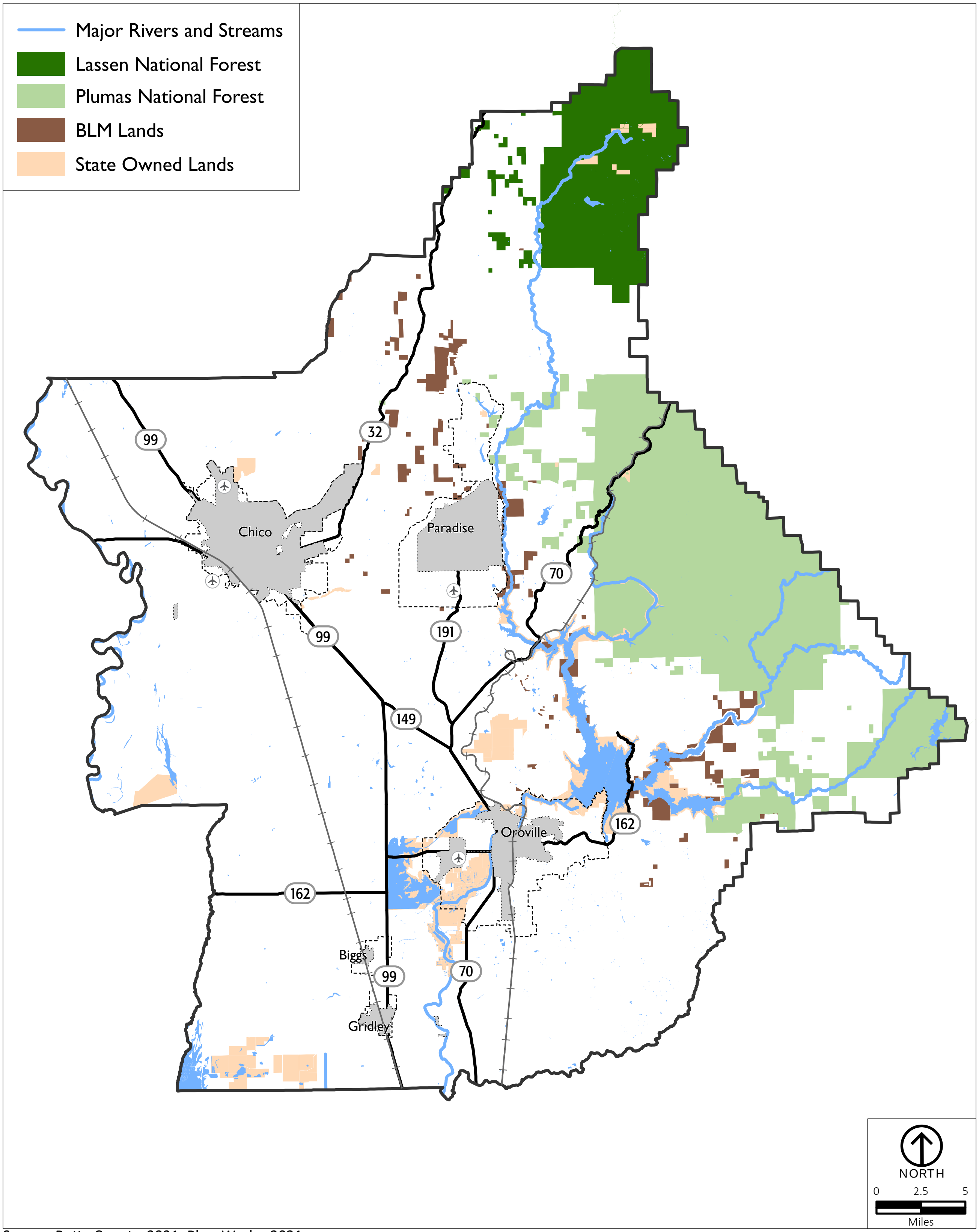
Various federal and State agencies manage lands and facilities that offer important recreation opportunities within the County. Refer to Figure 8-2 for a map of federal, State, and local recreation lands.

1. Federal Recreation Lands

This section describes the recreational opportunities found in areas under federal agency management, including the U.S. Forest Service and Bureau of Land Management.

a. U.S. Forest Service

Butte County contains approximately 134,840 acres of federally owned National Forest Land. Two National Forests extend into Butte County: Plumas National Forest and Lassen National Forest. A 209-acre research center, the Genetic Resource & Conservation Center, just outside of Chico, is administered by Mendocino National Forest. National forests, managed for multiple-use, emphasize providing dispersed recreation opportunities. They provide county residents and visitors with a wide variety of recreation experiences in a natural setting. Most visitors come from northern California counties, including the major population centers of San Francisco, Sacramento, Red Bluff, and Redding. Streams, natural lakes, man-made reservoirs, trails, and campgrounds are the principal attractions.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE 8-2

FEDERAL AND STATE RECREATION LAND

i. Plumas National Forest

Recreation opportunities in the Plumas National Forest include fishing, hunting, hiking, horseback riding, camping, nature photography and study, swimming, biking, off-road vehicle use, and mining (with a permit). Dispersed uses are complemented by recreational developments including campgrounds, trails, picnic areas, boat launch ramps, sanitation facilities, and parking areas. Recreation areas occur throughout the forest; however, the most important and heavily used areas available within the county include the Middle Fork of the Feather River, Feather Falls Scenic Viewpoint, and Milsap Bar and Rogers Cow Camp Campgrounds. Sly Creek and Strawberry developed campgrounds are located on Sly Creek Reservoir. The Feather River Ranger District is located within Butte County. As a result of recent wildfires and COVID-19, several recreation facilities in Plumas National Forest are currently closed.

ii. Lassen National Forest

Lassen National Forest recreational opportunities include camping, hunting, fishing, hiking, horseback riding, driving for pleasure, picnicking, snowmobiling, skiing, and off-road vehicle use. According to a 2,000-visitor survey, there were an estimated 656,068 visits to the forest in 2007 (a national forest visit is defined as the entry of one person on national forest land to participate in recreation activities for an unspecified period). Table 8-6 lists the Lassen National Forest campgrounds and recreation sites and their locations, sizes, and facilities within Butte County.

The Lassen National Forest provides two campgrounds in the northwestern tip of the county. These campgrounds include Cherry Hill and Butte Meadows. The Boy Scouts of America have a privately owned camp within Lassen. The State Route 32 highway corridor provides access to the scenic Butte Meadows area.

iii. Mendocino National Forest Research Facility

Mendocino National Forest administers a 209-acre genetic research facility for coniferous tree species southeast of Chico. This facility, named the Chico Genetic Resource and Conservation Center, contains a paved trail providing public access through a 60-acre portion of the Center. This trail provides wheelchair access and receives heavy use by persons with disabilities. The facility is especially popular on Arbor Day and remains busy throughout the year for group tours.

b. Bureau of Land Management

The U.S. Bureau of Land Management (BLM) owns approximately 15,590 acres in Butte County, consisting primarily of scattered foothill lands. The majority of BLM land falls within the "Forks of Butte Creek" subsection of the Ishi Management Area. BLM has designated it holdings on the Butte Creek canyon from above the Forks of Butte Creek to Helltown as an Outstanding Natural Area. In the upper Butte Creek canyon area, the Forks of Butte Creek Recreation Area is the only public access site for recreation. This area provides hiking, fishing, tubing, kayaking, picnicking and camping, among other activities. In addition to these facilities, the BLM manages about 120 acres near Magalia that include a series of nature trails.

2. State Recreation Resources and Historic Sites

A number of recreation facilities and historic sites and properties are owned and administered by the State of California.

a. State Parks and Recreation Areas

Table 8-7 lists Butte County's State parks, reserves, and State recreation areas and their locations and sizes. Existing State parks and recreation areas include the Lake Oroville State Recreation Area, which encompasses 47,000 acres and 12 separate recreation areas, as detailed in Table 8-7. Two wildlife management areas are operated by the State, including the Oroville State Wildlife Area near Lake Oroville and the Grey Lodge Wildlife Area located southwest of Gridley. The Grey Lodge Wildlife Area includes 600 acres of riparian woodlands; portions of the original 2,540-acre parcel are believed to be undisturbed native marshland.

The Bidwell River Park, west of Chico, is a 180-acre park with amenities, including boat launches and picnic tables. As of 2007, this park served 500 visitors daily.

b. State Historic Sites and Monuments

Several State historic sites are found within Butte County. Among these are the Bidwell Mansion State Historic Park, a 5-acre park encompassing the historic home of John Bidwell, Chico's founder, and the house's grounds. Other State-designated historic sites and monuments include the Chinese Temple and the Ishi Monument, both in Oroville; the town site of Oregon City, a historic mining community; and the site of the old Bidwell Bar Bridge, now inundated by Lake Oroville.

Table 8-8 lists Butte County's State-designated historic sites, landmarks, and monuments and their locations and facilities.

E. Recreational Corridors, Wild and Scenic Rivers, and Trails

This section describes the array of recreational travel corridors, highways, scenic rivers, and trails in Butte County.

1. Recreational Corridors - Highway Travel

Recreational driving and travel is an important pastime for many visitors to Butte County, both for the enjoyment of the County's many scenic highways and byways, as well as for access to public recreation lands and resources. Several transportation corridors in the county provide access to recreational opportunities located in the foothills of the Sierra Nevada Mountains. About five miles north of Oroville, State Route 70 (commonly called the Feather River Highway) turns northeast through the foothills to Plumas National Forest. It provides access to the Feather River canyon area and into the Sierra Nevada foothills in Plumas County. Highway 149 is an important transportation corridor between South Routes 70 and 99, connecting the community of Oroville to the Chico area. State Route 99 provides access to valley and riparian environments as well as recreation areas. From Sutter County north, State Route 99 follows the Feather River and just north of Chico turns northwest towards Red Bluff. State Route 32 provides access from the Chico area northeast to the alpine environment of Butte Meadows.

Although there are no officially designated State Scenic Highways in Butte County, Highway 149 near Highway 70 and Wicks Corner is considered an eligible State Scenic Highway.

2. Wild and Scenic Rivers

A 77.6-mile portion of the Middle Fork of the Feather River has federal Wild and Scenic River status.[1] This river is located within the boundaries of the Plumas National Forest. The wild and scenic designation covers 24,000 acres, generally within a ⅛- to ¼-mile band along the river and extends from Beckworth in the Sierra Valley (Plumas County) to Lake Oroville. Approximately 10.5 miles of this wild and scenic river flow through Butte County. The river represents a unique free-flowing stream that is the only charter member of the National Wild and Scenic River System in California.

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[1] National Wild and Scenic Rivers System. Feather River (Middle Fork), California. Accessed February 20, 2021. https://www.rivers.gov/rivers/feather.php

Within the county, the river falls into two distinct management zones. The first is the Bald Rock Canyon Wild River Zone, which extends from Lake Oroville (900 feet elevation) upstream for about 5.4 miles through Bald Rock Canyon to the junction of an unnamed drainage on the east side of the river (1,500 feet elevation). The second is the Milsap Bar Scenic River Zone, which is about 3.6 miles long, and continues upstream from the Bald Rock Canyon Wild River Zone to a point about five miles east of Devil's Gulch.

Both zones provide a recreational experience compatible with a free-flowing river. The river meanders through meadowlands and a small canyon. Milsap Bar campground is located within the Wild and Scenic River area and provides overnight camping facilities and river access by dirt road. No other road access is available along the river in Butte County. Access and uses are restricted along the river. Gold dredging is permitted only in the Milsap Bar Scenic River Zone.

3. Trails

Butte County does not have any formal or organized system of trails nor a specific interest group involved in the formation and promotion of a county or region-wide trails system. However, a number of developed recreational trails are found in the county, many of which are located within the National Forest lands in the foothills eastern Butte County. These include two National trails, as follows:

- Pacific Crest National Scenic Trail – Approximately 6 miles of the federally designated Pacific Crest National Scenic Trail is in Lassen National Forest on the eastern Butte-Plumas County border. The Pacific Crest National Scenic Trail receives high use, as this trail provides continuous recreational access from Canada to Mexico.

- Feather Falls National Recreation Trail – This 3.5-mile trail is located within Plumas National Forest and provides hiking access to the Feather Falls National Scenic Area and to the Feather Falls, noted as the sixth-highest waterfall in the continental United States and third-highest waterfall in California. The Feather Falls trail and scenic area is a very popular spring and summer attraction.

In addition to these listed trails, a 17.5-mile loop trail at Loafer Creek and portions of the Freeman trail are accessible for equestrian riding at Lake Oroville State Recreation Area. Within the Chico Recreation and Park District, a system of trails serves the Chico urban area, and trails are also found within the Lake Oroville State Recreation Area and other City, State and District-managed parks and recreation lands. Table 8-9 lists the existing trails inventory for Butte County and their locations.

F. Private Recreational Facilities

Private recreational lands and facilities play a key role in county leisure activities, both for public and private use. Generally, the most popular private facilities include golf courses, tennis courts, and swimming, boating and water-skiing facilities. Utility companies, including Pacific Gas and Electric Company (PG&E) and the South Feather Water and Power Agency offer some recreational amenities in conjunction with the reservoirs and watershed lands associated with their power generation activities.

1. Utility-Company Owned Recreational Facilities

Pacific Gas & Electric (PG&E) owns and operates the following public recreational facilities that it has developed in conjunction with its hydroelectric plants: De Sabla Forebay fishing access and De Sabla Group Picnic Area, located off Skyway, approximately 10 miles north of Paradise; Philbrook fishing access, car-top boat launch, campground, and picnic area at Philbrook Lake, located approximately 30 miles north of Paradise; and Shady Rest picnic area, roadside rest, and information center, located on Highway 70.

The South Feather Water and Power Agency owns and manages several private recreation areas. These include two areas at Little Grass Valley Reservoir and two areas at Sly Creek.

2. Private Campgrounds

Private developed opportunities for recreational vehicle (RV) camping are available in Butte County, with most sites concentrated around the major population centers of Chico and Oroville. Private tent campgrounds are lacking in the County.

One privately owned RV and tent campground, River Reflections RV Park & Campground, functions primarily as an RV campground. This RV park and campground is in Oroville on the Feather River. It has sites and facilities for 91 RVs at maximum capacity. They are open and occupied year-round but usually operate at capacity only during peak vacation seasons. Other privately owned RV parks include River One RV Park, Berry Creek Rancheria RV Park, and Falling Rock RV Park.

3. Private Sports and Leisure Facilities

Recreation facilities in the Chico area include bowling alleys, public and private golf courses and driving ranges, swimming pools, health spas, gymnasiums, tennis and racquetball courts, hunting and fishing preserves, racetracks, skating rinks, museums, playgrounds, and parks. Prior to the 2018 Camp Fire, private recreational facilities in the Town of Paradise area include boat rentals, bowling alleys, golf, golf practice ranges, tennis, wineries, flea markets, museums, playgrounds, and parks.

Private recreational facilities in the Oroville area focus primarily on Lake Oroville and its environs. Facilities in the Oroville area include boat rentals, bowling alleys, golf courses, swimming pools, tennis, museums and two casinos that provide a variety of entertainment and recreational activities.

4. Hotels, Motels, Resorts, and Bed and Breakfasts

Overnight visitor accommodations in Butte County, excluding camping, are found primarily in the Chico, Oroville, and Paradise areas, though many Paradise area establishments have been impacted temporarily or permanently by the 2018 Camp Fire. The Chico area has an estimated 20 hotels/motels and 4 bed and breakfast establishments. The Oroville area has an estimated 13 hotels/motels and 1 bed and breakfast. Starting in mid-2020, tourism across the globe was significantly impacted by the COVID-19 pandemic, which has led many tourism-driven businesses, like hotels and motels to close temporarily or permanently due to lack of business.

G. Community Events

The residents of Butte County enjoy a wide range of community events in a variety of types including festivals, harvest fairs, musical events, parades, cultural events, and athletic events. These events play a large role in the social life of Butte County residents in every month of the year.

The Butte County Fair and Silver Dollar Fair are only two of at least eight different fairs that are held in the Butte County area. Festivals include the Salmon Festival in Oroville, the Snow Goose Festival in Chico, and a large variety of other harvest festivals that celebrate the natural, cultural, and agricultural heritage of Butte County.

Music is also an important component of the cultural scene in Butte County. Butte County is home to a number of popular parades and music festivals such as the Old Time Fiddlers Competition. A number of venues in Chico, Paradise, and Oroville host mainstream musical entertainers on a year-round basis. Due to the COVID-19 pandemic, music festivals and other community events have temporarily been shut down.

Athletic and outdoor activities also provide outlets for entertainment in Butte County. Bass fishing, golf, and a wide variety of other athletic events are held in Chico, Paradise, Oroville, and other locations in Butte County.

TABLE 8-1 RECREATION AND PARK FACILITIES IN THE CHICO AREA

Landowner	Location	Size (Acres)	Facilities
Regional Parks			
Bidwell Park, City of Chico	Northeast Chico, approximately 10 miles into the foothills	3,670	Golf course, swimming areas, ball fields, swimming pool, nature center, etc.
Community Parks			
Community Park, CARD	West of Hwy 99, north of 20th Street, Chico	40	Playing fields, playgrounds, picnic area, volleyball and tennis courts, BBQ area
Hooker Oak Recreation Area, City of Chico	On Chico Creek inside Bidwell Park	35	Playground, picnic areas, playing fields, BBQ area
One Mile Dam Area, City of Chico	Western section of Lower Bidwell Park	23	Swimming area, children's playground, softball field
Wildwood Park	Northeast Chico, adjacent to Bidwell Park	30	Play structure, tot lot, picnic areas, little league fields, multi-use sports field
DeGarmo Park, CARD	The Esplanade, north of East Avenue	36	Baseball and soccer fields, restrooms. Future facilities planned for this park include an aquatics center
Neighborhood Parks			
Baroni Park, CARD	Baroni Drive	7.3	Multi-use open turf play field, playground, basketball court, walking path, picnic tables, and disc golf baskets.
Hancock Park, CARD	Marigold and Middletown Avenue	3.8	Multi-use turf playfield, walking path, benches, and practice disc golf baskets
Humboldt Avenue State Park, CARD	371 Humboldt Avenue	3.8	Skate park
Oak Way Park, CARD	Oak Way and Nord Avenue	7.9	Basketball courts, lighted walking paths, open field space and covered picnic and barbecue areas.
Peterson Park, CARD	Denali Drive	4.1	Multi-use turf playfield, basketball court, playground, picnic tables, and a walking path.
Rotary Park, CARD	16th Street at Salem Street	0.7	Playground and basketball courts
Children's Playground, City of Chico	Western end of Bidwell Park	2.7	Play equipment and picnic area
City Plaza, Downtown Chico	5th Street at Broadway	1.7	Benches and covered areas
"Triangle" Park, City of Chico	9th Street at Main Street	Very small	None

TABLE 8-1 RECREATION AND PARK FACILITIES IN THE CHICO AREA (CONTINUED)

Landowner	Location	Size (Acres)	Facilities
School Parks			
California State University, Chico Recreation Facility,* CSU, Chico	Western end of Bidwell Park	119	Outdoor pool, racquetball courts, sports fields, football stadium, track, golf course
Chico Senior High School, Chico Unified School District	901 Espalande, Chico	No Information	Ball fields, tennis courts
Pleasant Valley High School, Chico Unified School District	1476 East Avenue, Chico	No Information	Ball fields, tennis courts
Bidwell Junior High School, Chico Unified School District	2376 North Avenue, Chico	No Information	Ball fields, tennis courts
Chico Junior High School, Chico Unified School District	280 Memorial Way	No Information	Soccer fields
Marsh Junior High School, Chico Unified School District	2253 Humboldt Road	No Information	Ball Fields
Other Schools			
The following is a list of schools in the Chico area that provide other neighborhood recreation functions:			
Chapman Elementary Citrus Elementary Hooker Oak Elementary Emma Wilson Elementary John McManus School Little Chico Creek School	Neal Dow School Marigold School Parkview School Shasta School Rosedale School Sierra View Elementary		
Other Recreation Centers/ Pools			
Pleasant Valley Recreation Center, CARD	Northeast Chico, North Avenue	Building: 5,970 ft^2	Recreational programming and facility rentals
Community Center, CARD	Lower end of Bidwell Park	Building: 12,337 ft^2	Community center building
Dorothy F. Johnson Center, CARD	Chapman neighborhood	Building: 6,375 ft^2	Multi-purpose room, game room, meeting rooms
Lakeside Pavilion, CARD	California Park Drive	Building: 6,000 ft^2	Meeting rooms, event facility, offices
Chico Creek Nature Center, CARD	Bidwell Park	4,700 ft^2	Museum, classrooms, multi-purpose room
Silver Dollar Fairgrounds, Privately Owned	2357 Fair Street, Chico	63	Annual Fair, shows, events, rodeos, auto racing

*The University's rules often do not allow the general public to use University facilities.

Source: Chico Area Recreation District, 2019.

TABLE 8-2 RECREATION AND PARKS DISTRICT FACILITIES IN THE OROVILLE AREA

Landowner	Location	Size (Ares)	Facilities
Regional Parks			
River Bend Park, District	End of Montgomery Street	210	Amphitheatre, boat launch, disc golf, fishing ponds and a dog park, swimming area, benches, covered picnic tables, sand beach and trails
Community Parks			
Bedrock Park and Lagoon, City of Oroville	Arlin Rhine Drive and 5th Avenue	3.8	Amphitheater, tennis courts and swimming area
Mitchell Park, District	Mitchell and 5th Avenues	15.3	Playing fields, tot play area
Feather River Parkway, District/ City of Oroville	Below the Feather River dam	15	Bike path, hiking trail
Martin Luther King Park District	3 blocks south of Wyandotte Avenue, east of Myers Street	5.6	Basketball and volleyball courts
Lott-Sank Park, City of Oroville	Downtown Oroville, Montgomery and 4th Street	1.9	Museum, picnic area
Hewitt Park, City of Oroville	Baldwin Avenue near Myers Street	7.6	Antique steam engines, play equipment
Nelson Ballfields, District	6th Street off Nelson Avenue	30	Sports facility, recreation building, tennis courts
Forbestown Park and Community Center, District	Forbestown Road	3.6	Museum and multi-purpose facility
Palermo Park, District	Lincoln Boulevard near Palermo Road	5	Amphitheater, basketball courts, ball fields
Neighborhood Parks			
Rotary Park, City of Oroville	Safford and 1st Avenues	2.1	Sports fields, picnic area
Hammon Park, City of Oroville	2nd Street between Nelson and Rand Streets	4	Picnic area
Playtown USA, District	Pomona and 5th Avenues	No Information	Playground
Wyandotte Park, City of Oroville	Foothill Boulevard, north of Wyandotte	2.6	Basketball courts, picnic area
Parking Lot A, City of Oroville	Robinson Street between Myers and Huntoon Streets	0.5	Playground, picnic area
Nature Center, City of Oroville	No Information	5	Picnic area

TABLE 8-2 RECREATION AND PARKS DISTRICT FACILITIES IN THE OROVILLE AREA (CONTINUED)

Landowner	Location	Size (Ares)	Facilities
Schools			
The following schools have facilities that function as neighborhood parks:			
Bangor Union Elementary Concow School Helen Wilcox Elementary Oroville High School Prospect Alternative Las Plumas High School Sierra Avenue School	Stanford Avenue School Palermo School Ophir School Harrison Stadium Central School Honcut School Nelson Avenue School		
Other Public and Quasi-Public Facilities			
Bangor Park, Bangor Community Club	No Information	8.1	Playing fields, tennis courts
Shooting Range, State of California	Oroville area	n/a	
Memorial Hall, Butte County	2374 Montgomery Street	n/a	

Source: Feather River Recreation and Park District, 2021.

TABLE 8-3 RECREATION AND PARK FACILITIES IN PARADISE AREA

Landowner	Location	Size (Acres)	Facilities
Regional Parks			
Paradise Lake, PRPD	North Lake Road, Paradise	204	Paddling, fishing, hiking, mountain biking, and other activities
Community Parks			
Coutolenc Park, PRPD	On Coutolenc Road, North of Magalia	367	Paradise Bowhunters Archery Range, hiking, picnic area, mountain biking, day camps and programs, and chemical toilets
Paul Byrne Aquatic Park and Rotary Grove Park, PRPD	Buschmann Road and Recreation Drive, Paradise	5	Swim pool, fishing pond, playground, picnic area, restrooms, group barbecue area, sand volleyball courts, and horseshoe pits.
Moore Road Park, PRPD	Moore Road and Forest Service Road, Paradise	19	Ball fields, bleachers, picnic area, and horse-riding arena
Paradise Community Park, Town of Paradise	Black Olive Drive and Pearson Road, Paradise	-	Picnic tables, restrooms, playground, and Depot Museum
Terry Ashe Recreation Center, PRPD	6626 Skyway, Paradise	3.5	Business office, recreation center, picnic area, playground, gazebo, restrooms, and slab area
Paradise Lake Picnic Area, PRPD	Lucretia Road, Paradise	8.3 mi^2	Fishing, hiking, picnicking playground, mountain biking, kayaking, boat ramps for non-gas engines, and chemical toilets
Clotilde Merlo Park, Private	Stirling City	20	Meadows, reflection ponds, trails, horseshoe pits, bocce courts, wedding chapel, and restrooms
Neighborhood Parks			
Bille Park, PRPD	501 Bille Road, Paradise	55	Playground, picnic area, group barbecue area, meadow, nature trail, and restrooms
Crain Memorial Park, PRPD	Jeffrey Lane, Concow	8	Picnic area, meadow, and chemical toilets
Oak Creek Park, PRPD	East end of Pearson Road	20	Walking trail, undeveloped
Noble Park, PRPD	Pentz Road	20	Undeveloped
Lakeridge Park, PRPD	Lakeridge Circle, Magalia	26	Undeveloped trails, future development site
Paradise High School, Paradise Unified School District	5911 Maxwell Drive, Paradise	26	Track, tennis courts, football field, baseball field, softball field, play fields, gymnasium, and multi-purpose facility
Ridgeview High School, Paradise Unified School District	Pearson Road, Paradise	4	Play field and hard surface play area

TABLE 8-3 RECREATION AND PARK FACILITIES IN PARADISE AREA (CONTINUED)

Landowner	Location	Size (Acres)	Facilities
Paradise Intermediate School, Paradise Unified School District	550 Pearson Road, Paradise	11	Play fields, outside basketball courts, gymnasium, and multi-purpose facility
Cedarwood Elementary School, Paradise Unified School District	6400 Columbine Road, Magalia	10	Play fields, playgrounds, and multi-purpose facility
Pine Ridge Elementary School, Paradise Unified School District	13878 Compton Drive, Magalia	20	Play fields, playground, outside basketball courts, and multi-purpose facility
Paradise Ridge Elementary School, Paradise Unified School District	6593 Pentz Road, Paradise	11	Play fields, playground, and multi-purpose facility
Linear Parks			
Paradise Memorial Trailway Town of Paradise	Neal Road to Pentz Road, Paradise	4 miles (80- to 100-foot right of way)	Paved walkway along old railroad line
Magalia and Paradise Lake Loop Trail	Lakeridge Park, Coutolenc Park, and Paradise Lake	15 miles	Future 15-mile multi-use trail loop connecting Lakeridge Park, Coutolenc Park, and Paradise Lake

Source: Paradise Recreation and Park District, 2021.

TABLE 8-4 DURHAM AREA RECREATION AND PARKS DISTRICT FACILITIES AS OF 2007

Landowner	Location	Size (Acres)	Facilities
Regional Parks			
None.			
Community Parks			
Louis Edwards Park, District	9447 Midway, community of Durham	3.8 park	Dwight Brinson Swim Center, which contains a 25-meter swimming pool with diving board, wading pool, locker room; park contains tennis courts, and rest rooms
Ravekes Park, District	9451 Midway, community of Durham	½	Small children's playground, four tennis courts, and two picnic tables
Midway Field, District	Southeast Corner of Midway, community of Durham	6	Multi-purpose sports facilities, bleachers, and drinking fountain
Durham Community Park, District	1847 Durham-Dayton Highway, two miles east of Durham	24	Sports facilities, horse arena, picnic areas, children's playground, concession stand, and bleachers
Butte Community College, Butte-Glenn Community College District	10 miles east of the community of Durham	234	Tennis courts, soccer fields, and other facilities.*
Neighborhood Parks			
Durham Elementary School and Durham High School, Durham Unified School District	Adjacent to each other in Durham	No Information	Various ball courts, playing fields, and playground equipment
Durham Memorial Hall, District	9319 Midway, City of Durham	8496 ft^2	Main hall with stage, full kitchen, and two meeting rooms
Nelson Park, District	On Midway Street in Nelson, seven miles south of Durham	2.5	Baseball fields, swings, "open park"

* Durham area residents are allowed to use Butte College facilities, which are owned and maintained by the college.
Source: Durham Recreation and Parks District, 2003.

TABLE 8-5 GRIDLEY-BIGGS AREA PARKS AND OTHER RECREATIONAL FACILITIES AS OF 2007

Landowner	Location	Size (Acres)	Facilities
Regional Parks			
Butte County Fairgrounds, County	Gridley	17.5	Facilities open year-round; fair features horticulture, agriculture, and floriculture exhibits, and livestock show; also includes meeting area, auditorium, event space sports arenas, gymnasium, education facilities, and picnic areas
Community Parks			
Vierra Park	Gridley	12	Adult play fields, children's play area, and ball courts
Olympic-Size Swimming Pool, County	Gridley: Between high school and fairgrounds	- -	Swimming pool
Community Swimming Pool, County	Biggs High School	- -	Swimming pool
Cork Oak Park	Biggs	1	Fields and ball courts
Neighborhood Parks			
Biggs Family Park	Downtown Biggs	7	Picnic tables and grass field
Daddow Plaza	Downtown Gridley	1	Bandstand, picnic tables, and gazebo surrounding area that can be assumed to take on a recreational function
Schools			
Gridley High School	Manzanita School		
Sycamore School	Wilson School		
McKinley School	Biggs Elementary School		
Biggs Middle/Junior High School	Esperanza High School		

Source: Cities of Biggs & Gridley, 2003. Landowner and facility size could not be obtained.

TABLE 8-6 LASSEN NATIONAL FOREST CAMPGROUNDS AND RECREATION SITES

Facility	Location	Size (Acres)	Facilities
Cherry Hill Campground	In LNF on Butte Creek; T26N R4E SEC14	14	26 sites total, 5 walk-in sites, 9 tent-only drive in sites, 12 tent/RV sites, RV limit 22 ft., potable water, vault toilets
Butte Meadows Campground	LNF on Butte Creek; T26N R4E SEC28	4	13 tent/RV sites, drinking water, and vault toilets
Camp Lassen, Boy Scouts of America	On private land owned; Highway 32 by Butte Meadow	No Information	Lodge building, and water supply, and several other buildings
Trailheads			
Jonesville Snow Park	R4E T26N S14		9 miles of ungroomed cross-country ski trails for beginning and advanced skiers, 60 miles of groomed snowmobile trail, vault toilets, paved parking, accessible year-round
Jonesville Canyon	R5E T26N S18		3 mile out and back trail at the headwaters of Butte Creek, no facilities
Cold Springs	R5E T26N S15		Access point for the Pacific Crest Trail in LNF, no facilities

Note: LNF =Lassen National Forest.
Source: Lassen National Forest, 2021.

TABLE 8-7 STATE PARKS, RESERVES, AND RECREATION AREAS

Facility*	Location
Lake Oroville Recreation Area State of California	Lake Oroville and surrounding lands
Lime Saddle Area	West Branch Feather River
Goat Ranch Area	Extreme northern end of lake
Potter Ravine Area	Southwestern lakeshore
Spillway Area	Southwest lake by dam
Thermalito Forebay North Area	Area directly to west of Oroville Dam
Visitor Center	Atop Kelly Ridge, southern end of lake
Bidwell Canyon Area	Southern shore of lake
Loafer Creek Area	Southeast lake
Craig Saddle Area	Eastern lakeshore
Sycamore Creek Area	Eastern lake on Middle Fork of Feather River
Foreman Creek Area	Eastern lakeshore
Thermalito Forebay South Area	Area southwest of lake
Oroville State Wildlife Area	Highway 70, just west of city of Oroville
Gray Lodge State Waterfowl Management Area	Area southwest of Gridley

* The State Parks, Reserves, and Recreation Areas listed above and/or any of the facilities and/or amenities they offer may be temporarily closed due to fire impacts and/or COVID-19.

TABLE 8-8 STATE HISTORIC SITES, LANDMARKS, AND MONUMENTS AS OF 2007

Historic Site	Location	Facilities
No. 313 Hooker Oak	Bidwell park, Hooker Oak Recreation Area, Manzanita Ave. between Vallombrosa and Hooker Oak Ave., Chico	Park
No. 314 Old Suspension Bridge	Lake Oroville State Recreation Area, Bidwell Canyon Road, Oroville	Site of the Mother Orange Tree of Butte County. Site of the Bidwell Bar Bridge. Now inundated by Oroville Reservoir.
No. 329 Rancho Chico and Bidwell Mansion State Historic Landmark and State Historic Park	Adjacent to CSU Chico; 525 Esplanade	5 acres; ornate home of Chico's founder, John Bidwell. Tours, visitor's center, and site of park system's district headquarters*
No. 330 Bidwell's Bar	Lake Oroville Recreation Area, Bidwell Canyon, Bidwell Canyon Road, Oroville	Second County Seat of Butte County and Courthouse, now inundated 120 yards west of the monument
No. 770 Chinese Temple	1500 Broderick Street, Oroville	Original place of worship for 10,000 Chinese that lived in the Oroville area
No. 807 Oregon City	Diggins Road between Oroville and Cherokee	Former townsite and a covered bridge with adjacent monument
No. 771 Dogtown Nugget Discovery Site	0.3 miles north of Pentz-Magalia Road on Skyway Drive, Paradise	Site of largest gold nugget found in northern California (54 lbs)
Ishi State Historical Monument	Quincy Avenue, Oroville	The Last Yahi Indian Monument

* Level of Use: Approximately 50,000 visitors per year.
Source: Butte County Development Services, 2003.

TABLE 8-9 MAJOR BUTTE COUNTY RECREATION TRAILS

Trail Name	Location
Yahi Trail	City of Chico, Upper Bidwell Park
Big Bald Rock Trail	Big Bald Rock, Plumas National Forest
Dome Trail	below Bald Rock Dome (Bald Rock Canyon Trail), Plumas National Forest
Lower Seven Falls/Milsap Bar Falls	South Branch Middle Fork Feather River, Plumas National Forest
"Snag Lake" Trail	Lassen Volcanic National Park, Butte meadows to Snag Lake
Butte Creek Trail	Plumas National Forest, begins at Doe Mill Ridge and follows east bank of Butte Creek
Paradise Parkway Trail	City of Paradise, through town
Valley Ridge Trail	Lassen National Forest, Butte Creek Canyon rim
Paradise Reservoir Trail	Town of Magalia, Paradise Reservoir
Brad Freeman Trail	Lake Oroville State Rec Area
Humboldt Peak	Lassen National Forest, part of Pacific Crest Trail
Feather Falls Scenic Area and Recreation Trail	Plumas National Forest
Little Chico Creek Trail	City of Chico, along Little Chico Creek
Butte Creek House Trail	Lassen Volcanic NP, Jonesville to Butte Creek House
California Hiking and Equestrian Trail	Along Thermalito Afterbay areas
Big Chico Creek Loop	City of Chico, Upper Bidwell Park
Jonesville Canyon Trail	Outside City of Chico
Mountain House Trail	1.9 mi.; north of Feather River Scenic Area
Middle Trail-Live Oak-Upper Trail Loop	City of Chico, Upper Bidwell Park
Hanson Bar Trail	Plumas National Forest, Butte boundary, south Feather River
Sky High Trail	Plumas National Forest, north of Feather River Scenic Area
Lindo Channel Trail	Within Chico Loop Trail
Tackle Dome Trail	Plumas National Forest, starts above Bald Rock Canyon
North Rim Trail	City of Chico, Upper Bidwell Park
South Rim Trail/Annie Bidwell Trail	City of Chico, Upper Bidwell Park
Rattlesnake Hill Trail	Lake Oroville State Rec. Area, North Thermalito Forebay

TABLE 8-9 MAJOR BUTTE COUNTY RECREATION TRAILS (CONTINUED)

Trail Name	Location
Pine Creek Loop	Sacramento River National Wildlife Refuge
Yellowstone Kelly Heritage Trail	City of Paradise, Runs parallel to Skyway
Table Mountain	Outside the City of Oroville, North Table Mountain Ecological Reserve
Dan Beebe Trail	City of Oroville, starts at Saddle Dam and follows Kelly Ridge towards visitor center
Indian Springs Trail	Town of De Sabla
Lime Saddle Memorial Park Trail	Lake Oroville State Rec Area, Northwestern side of Lake Oroville along West Branch of the Feather river

Trails may be temporarily closed due to fire impacts.

9 CULTURAL RESOURCES

This document provides an overview of cultural resources in Butte County, including an overview of the historical themes; a discussion of federal, State, and local regulations pertaining to the management of cultural resources; and a discussion of the types of cultural resources likely to be encountered.

Cultural resource is the term used to describe several different types of properties: prehistoric and historic archaeological sites, buildings, objects, structures, and districts or any other physical evidence associated with human activity considered important to a culture or a community for scientific, traditional, or religious reasons.

Federal regulations (36 Code of Federal Regulations [CFR] 800) define a *Historic Property* as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). This term includes artifacts, records, and remains that are related to and located within such properties. The term also includes properties of traditional religious and cultural importance to Native American tribes or Native Hawaiian organizations and that meet NRHP criteria.

State regulations, namely the California Environmental Quality Act (CEQA), have three defined terms that encompass cultural resources: *Historical Resource, Unique Archaeological Resource,* and *Tribal Cultural Resource*. Definitions for these terms are provided in Section A.2.a.

A. Regulatory Setting

This section presents federal, State, and local laws and regulations pertaining to cultural resources and Native Americans.

1. Federal Regulations

a. National Historic Preservation Act

The National Historic Preservation Act (NHPA) defines the responsibilities of federal agencies to protect and preserve Historic Properties. Sections 106 and 110 include specific provisions for the identification and evaluation of these properties for inclusion in the NRHP, such as consulting with interested parties that often include local Native American tribes.

Section 106 requires federal agencies, or those they fund or permit, to consider the effects of any of their undertakings (projects, activities, or programs) on properties that may be eligible for listing or that are listed in the NRHP (i.e., Historic

Properties). Regulations implementing Section 106 (36 CFR 800) lay out procedures for federal agencies to meet their Section 106 responsibilities. Although compliance with Section 106 is the responsibility of the lead federal agency, the work necessary to comply may be undertaken by others.

To determine whether an undertaking could affect Historic Properties, cultural resources (including archaeological, historical, and architectural properties) must be inventoried and evaluated for listing in the NRHP.

The Section 106 process generally follows the basic steps listed below, although all steps may not be necessary in each case.

- Once an undertaking is established, initiate consultation with the appropriate parties, and plan to involve the public.
- Identify Historic Properties and determine whether your undertaking has potential to affect them.
- Assess effects of the undertaking on Historic Properties to determine if effects are adverse.
- Consult with the State Historic Preservation Officer (SHPO) regarding the identification of Historic Properties, any effects the undertaking may have on Historic Properties, and whether these effects will be adverse.
- Notify all consulting parties (e.g., Native American or Native Hawaiian tribes and members of the public) of the determinations regarding potential adverse effects to Historic Properties. Any disagreements should be resolved through consultation.
- Consult on ways to modify the undertaking to avoid, minimize, or resolve adverse effects on Historic Properties.
- If needed, come to an agreement on measures and steps to resolve adverse effects through the adoption of either a Memorandum of Agreement (MOA) or, for larger or phased undertakings, a Programmatic Agreement (PA). These are agreement documents that outline the agreed-upon measures to resolve adverse effects.
- Proceed in accordance with the MOA or PA.

If all parties agree that there are no Historic Properties identified, or that the undertaking will not have an adverse effect on Historic Properties, an MOA or PA may not be necessary. Regardless, each step of this process should be documented for proof of compliance with the Section 106 process.

b. Federal Historic Significance Criteria

For federal projects, cultural resource significance is evaluated in terms of eligibility for listing in the NRHP. Structures, sites, buildings, districts, and objects over 50 years of age can be listed in the NRHP as significant Historic Properties. However, properties under 50 years of age that are of exceptional importance or are contributors to a historic district can also be included in the NRHP. The NRHP is administered by the National Park Service (NPS) and includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or traditional cultural significance at the national, state, or local level.

Criteria for listing in the NRHP is outlined in 36 CFR 60.4 and are rooted in the notion that the quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that:

1. Are associated with events that have contributed to the broad pattern of our history;
2. Are associated with the lives of people significant in our past;
3. Embody the distinct characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
4. Have yielded, or are likely to yield, information important in prehistory or history (36 CFR 60.4).

Through amendments to the NRHP in 1992 and their implementing regulations, federal responsibilities for consultations with interested parties, and especially with Indigenous tribes, during the Section 106 process were expanded. The result has been a more focused effort by federal agencies to involve interested parties in identifying Historic Properties of cultural significance and, if warranted, in considering effects that may result from a federal undertaking.

Traditional Cultural Properties (TCPs) are often identified as resources during these consultation efforts. TCPs are tangible cultural properties that have historical and ongoing significance to living communities, as evidenced in their traditional cultural practices, values, beliefs, and identity. A TCP must still meet one of the four criteria outlined in 36 CFR Part 60.4, described previously, and must retain integrity. A TCP is simply a different way of grouping or looking at historic resources, emphasizing a place's value and significance to a living community.

As such, the NRHP guidelines describe the types of cultural significance for which properties may be eligible for inclusion in the NRHP. A property with traditional cultural significance will be found eligible for the NRHP because it is associated with cultural practices or beliefs of a living community that:

a) Are rooted in that community's history, and

b) Are important in maintaining the continuity of the cultural identity of the community.

This type of significance is grounded in the cultural patterns of thought and behavior of a living community and refers specifically to the association between their cultural traditions and a historic property.

2. State Regulations

a. California Environmental Quality Act

CEQA was passed in 1970 to institute a statewide policy of environmental protection. It requires that public agencies that finance or approve public or private projects must consider the impacts of their actions on the environment, of which, Historical Resources, Unique Archaeological Resources, and Tribal Cultural Resources are a part. A project that may cause a substantial adverse change in the significance of a Historical Resource is a project that may have a significant effect on the environment (California Public Resources Code [PRC] 21084.1). Section 21083.2 requires agencies to determine whether proposed projects would have effects on Unique Archaeological Resources, and Section 21074(a)(1) concerns effects to Tribal Cultural Resources.

CEQA requires that if a project would result in significant impacts on cultural resources that are important or significant, alternative plans or measures must be considered to lessen or mitigate such impacts. Prior to the development of mitigation measures, the importance of cultural resources must be determined. The steps that are generally taken in a cultural resources investigation for CEQA compliance are as follows:

- ♦ Identify cultural resources in a project area;
- ♦ If cultural resources exist in the footprint of a project, evaluate the significance of resources;
- ♦ If significant resources are determined to exist, evaluate the potential impacts of a project on these resources; and
- ♦ Develop and implement measures to mitigate the impacts of the project only on *significant* resources, namely Historical Resources, Unique Archaeological Resources, and Tribal Cultural Resources.

"Historical Resource" is a term with a defined statutory meaning (PRC Section 21084.1). Under CEQA Guidelines Section 15064.5(a), Historical Resources include the following:

- ♦ A resource listed in the California Register of Historical Resources (CRHR) or determined to be eligible for listing in the CRHR by the State Historical Resources Commission (PRC Section 5024.1).
- ♦ A resource included in a local register of Historical Resources, as defined in PRC Section 5020.1(k), or identified as significant in a Historical Resource survey meeting the requirements of PRC Section 5024.1(g), will be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
- ♦ Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource will be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing in the CRHR (PRC Section 5024.1), including the following:
    - a. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
    - b. Is associated with the lives of persons important in our past;
    - c. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

d. Has yielded, or may be likely to yield, information important in prehistory or history.

The fact that a resource is not listed in, or determined to be eligible for listing in, the CRHR, not included in a local register of Historical Resources (pursuant to PRC Section 5020.1(k)), or identified in a Historical Resources survey (meeting the criteria in PRC Section 5024.1(g)) does not preclude a lead agency from determining that the resource may be a Historical Resource, as defined in PRC Section 5020.1(j) or 5024.1.

Historical Resources are usually 45 years or older and must meet at least one of the criteria for listing in the CRHR described previously, in addition to maintaining a sufficient level of integrity.

In addition, CEQA requires lead agencies to determine if a proposed project would have a significant effect on Unique Archaeological Resources. If an archaeological site does not meet the CEQA Guidelines criteria for a Historical Resource, then the site may meet the threshold of PRC Section 21083.2 regarding Unique Archaeological Resources. A Unique Archaeological Resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

The CEQA Guidelines note that if a resource is neither a Unique Archaeological Resource nor a Historical Resource, the effects of the project on that resource shall not be considered a significant effect on the environment (14 California Code of Regulations [CCR] Section 15064[c][4]). Considerations under CEQA for Tribal Cultural Resources are discussed in Section A.2.e.

b. California Health and Safety Code Section 7050.5(b) and CEQA Section 15064.5

Section 7050.5(b) of the California Health and Safety Code specifies protocol when human remains are discovered during activities involving ground disturbance. If human remains are discovered or identified in any location other than a dedicated cemetery, there should be no further disturbance or excavation nearby until the county coroner has determined the area is not a crime scene that warrants further investigation into the cause of death and made recommendations to the persons responsible for the work in the manner provided in Section 5097.98 of the PRC. This section provides guidance for proceeding when human remains associated with Native American burials and associated items are encountered.

CEQA Guidelines Section 15064.5(e) requires that excavation activities stop whenever human remains are uncovered during a project or activity, and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are Native American, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. At that time, the lead agency must consult with the appropriate Native American descendants, if any, as identified by the NAHC. Under certain circumstances, the lead agency (or applicant), is required to develop an agreement with the Native American descendants for the treatment and disposition of the remains.

In addition to the mitigation provisions pertaining to accidental discovery of human remains, Section 15064.5(f) of the CEQA Guidelines also requires that a lead agency make provisions for the accidental discovery of historical or archaeological resources, generally. These provisions should include an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be a Historical Resource or Unique Archaeological Resource, avoidance measures should be implemented or appropriate mitigation should be available.

c. Public Resources Code Section 5097.9

California PRC Section 5097.9 states that no public agency or private party on public property shall interfere with the free expression or exercise of Native American Religion. The code further states that:

> …nor shall any such agency or party cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require.

County and city lands are exempt from this provision, expect for parklands larger than 100 acres.

d. Government Code 65352.3-5 (Senate Bill 18), Local Government – Tribal Consultation

California Government Code Section 65352.3-5, formerly known as Senate Bill (SB) 18, states that prior to the adoption or amendment of a city or county's general plan, or specific plans, the city or county shall consult with California Native American tribes that are on the contact list maintained by the NAHC. The intent of this legislation is to preserve or mitigate impacts on places, features and objects, as defined in PRC 5097.9 and PRC 5097.993, that are located within the city or county's jurisdiction. The bill also states that the city or county shall protect the confidentiality of information concerning the specific identity, location, character and use of those places, features and objects identified by Native American consultation. Government Code 65362.3-5 applies to all general and specific plans and amendments proposed after March 1, 2005.

e. Assembly Bill 52

Effective July 1, 2015, Assembly Bill 52 (AB 52) amended CEQA to require that: (1) a lead agency provide notice to those California Native American tribes that requested notice of projects proposed by the lead agency; and (2) the lead agency consult with any tribe that responded to the project notice within 30 days of receipt with a request for consultation. Topics that may be addressed during consultation include Tribal Cultural Resources, the potential significance of project impacts, the type of environmental document that should be prepared, and possible mitigation measures and project alternatives.

A California Native American tribe is defined as "a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of the Statutes of 2004." This includes both federally and non-federally recognized tribes.

Section 21074(a) of the PRC defines Tribal Cultural Resources for the purpose of CEQA as:

> Sites, features, places, cultural landscapes (geographically defined in terms of the size and scope), sacred places, and objects with cultural value to a California Native American tribe that are any of the following:

a. Included or determined to be eligible for inclusion in the CRHR; and/or

b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1; and/or

c. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Because criteria a and b also meet the definition of a Historical Resource under CEQA, a Tribal Cultural Resource may also require additional consideration as a Historical Resource. Tribal Cultural Resources may or may not exhibit archaeological, cultural, or physical indicators.

Recognizing that California tribes are experts in their tribal cultural resources and heritage, AB 52 requires that CEQA lead agencies provide tribes that request notification an opportunity to consult at the commencement of the CEQA process to identify Tribal Cultural Resources. Furthermore, because a significant effect on a Tribal Cultural Resource is considered a significant impact on the environment under CEQA, consultation is used to develop appropriate avoidance, impact minimization, and mitigation measures.

f. Assembly Bill 168

AB 168 was signed in 2020 and extends the responsibility of a development proponent to consult with Native American tribes to streamlined ministerial approvals for affordable multifamily housing developments under SB 35. A development with streamlined ministerial approval under SB 35 is not subject to CEQA, allowing for such developments to occur without going through a CEQA review or screening process to determine if they would affect Tribal Cultural Resources.

AB 168 requires a development proponent to submit notice of its intent to apply for streamlined approval to the local government prior to the actual application submittal. The local government is then required to provide formal notice to each California Native American tribe that is culturally affiliated with the geographic area of the proposed development and to engage in a "scoping consultation" regarding the potential effects the proposed development could have on a potential Tribal Cultural Resource (California Code Section 65913.4(b)).

The scoping consultation must commence within 30 days after the proponent submits a notice of intent to apply for ministerial approval and concluded before the proponent can submit the application.

This bill deems a project ineligible for the streamlined, ministerial approval process and require it be subject to CEQA if:

> (A) The site of the proposed development is a Tribal Cultural Resource that is on a national, State, tribal, or local historic register list;
> (B) The local government and the California Native American tribe do not agree that no potential Tribal Cultural Resource would be affected by the proposed development; or
> (C) The local government and California Native American tribe find that a potential Tribal Cultural Resource could be affected by the proposed development and the parties do not document an enforceable agreement regarding the methods, measures, and conditions for treatment of those tribal cultural resources, as provided.

3. Local Regulations

a. Butte County Code

Cultural resources are not separately addressed in the Butte County Code but are incorporated into various sections of it. The County Code provides for the protection of cultural resources in Chapter 20, Subdivision, and Chapter 24, Zoning.

Chapter 24-85 requires provisions for clustered development to retain open space for the preservation of environmentally sensitive areas, including important cultural resources (24-85(B)). It also lists sensitive archaeological sites as areas not suited for development (24-90(A)(4)) and requires telecommunications facilities to be located more than 500 feet from any building or feature listed as culturally significant (24-181-A(3)(c)). It also prohibits locating such facilities in areas of historical or cultural importance unless there are no feasible alternatives, in which case the Northeast Information Center at California State University (CSU) Chico and the Butte County Historical Society would review and comment on the application (24-181-O). It sets standards for unanticipated discoveries of archaeological resources during construction activities in the sports and entertainment zones, requiring construction to cease in the event an archaeological resource is discovered until an archaeologist is brought in to assess and treat the discovery (24-24(F)).

Additionally, Chapter 24-34.1 outlines land use and development standards specific to the Butte Creek Canyon Overlay Zone intended to protect and preserve the historical and ecological resources important to Butte County, and specifically mandates consulting the California Historical Resources Information System and CSU Chico for recommendations and mitigations necessary to preserve historic, cultural, and archaeological sites (24-34.1D(5)).

Finally, Chapter 20 mandates more restrictive setbacks in areas where structural development would destroy historic and archaeological sites (20-121.1(3)). It also requires submittal of an archaeological survey along with a vesting tentative map when filing for a build (20-255(b)(8)).

b. Municipal General Plans

California land use law requires that every city, town, and county adopt a general plan. Individual cities and towns in Butte County that currently have adopted General Plans that consider a cultural resources element include Oroville, Chico, Biggs, and Paradise. Cultural resource provisions in these individual plans typically include goals and policies to preserve archaeological and historic resources, conduct current inventories of cultural resources and historic landmarks in the city or town jurisdiction, and develop or adhere to guidelines to ensure that potential impacts to cultural resources are minimized.

These individual general plans can be updated up to four times per year, and their mandates and provisions are regularly in the process of being re-worked, updated, and finessed to apply to relevant and up-to-date community concerns about land use. Any planning or land use development that occurs within the limit of a city or town will be subject to the individual goals, policies, provisions, and procedures of the most current city-specific or town-specific General Plan.

B. Cultural Setting

1. Prehistoric Context

Butte County encompasses the Sacramento Valley, northern Sierra Nevada foothills, and southern Cascades areas. Although the history of human occupation in these three areas differs archaeologically, it is generally characterized by a number of related trends throughout the last 10,000 years. Patterns of cultural change that can be seen in the archaeological record are a result of prehistoric populations responding to gradual changes in climate, population growth, and availability of needed resources, such as food and shelter. The cultural responses to these changes include focusing on using specific types of resources and fully exploiting such resources, settlement in one place for longer periods of time, and trading goods with other groups in the region. The following summary of the prehistory of Butte County describes the cultural patterns in the three archaeological environments.

a. Central Valley

This summary of the archaeology of the Central Valley (which includes the Sacramento Valley) is split into three general timelines of human history: The Early, Middle, and Late Horizons. The archaeological trends attributed to these time periods are known as the Windmiller, Berkeley, and Augustine Patterns, which show a continuous and gradual cultural response to both environmental and social constraints.

Archaeological evidence of humans in the Central Valley from the Pleistocene era (circa 10,000–8,000 B.C.) is scarce. A few sites have been found south of Butte County in the Mokelumne River area and at Rancho Murrieta.[1,2,3] Although humans were living in the Central Valley during the Pleistocene era, sites from this time are deeply buried in the gravels and silts that have accumulated in the Central Valley from erosion and river flooding over the last 5,000 years, or they have eroded away.

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[1] Johnson, J.J., 1967. The Archaeology of the Camanche Reservoir Locality, California. Paper 6. Sacramento, CA: Sacramento Anthropological Society.

[2] Johnson, J.J., 1967. The Archaeology of the Camanche Reservoir Locality, California. Paper 6. Sacramento, CA: Sacramento Anthropological Society.

[3] Peak & Associates, Inc., 1981. Archaeological Investigation of CA-SAC-370 and CA-SAC-379, the Rancho Murieta Early Man Sites in Eastern Sacramento County. Sacramento, CA: Ann S. Peak and Associates.

The Central Valley gradually became both warmer and drier at the end of Pleistocene era and beginning of the Holocene era, which led people to change their food-procurement strategies to make use of a more diverse range of smaller plants and animals.

i. Early Horizon: 6,000–2,000 BC

This era is generally characterized by people living in small groups and moving around expansive territory to access a wider range of smaller resources that were seasonally available in different ecozones. Specialized tools were necessary to procure and process the wider range of plants and animals that were being used. As population increased around 4,000 BC, it became difficult to access enough food to maintain good heath, and people started to find ways to increase the amount of food that could be procured from smaller areas of land.[4] This intensification of resources is known as the Windmiller Pattern.[5]

Artifacts and faunal remains at Windmiller sites show that a diverse range of resources was exploited, including seeds and a variety of small game and fish. Fish spears, fishhooks, baked clay cooking balls, and ground stone items such as mortars and pestles are typical Windmiller pattern artifacts. People buried their dead in formal cemeteries and conducted burial rituals.[6]

ii. Middle Horizon: 2,000 BC–AD 500

Central Valley inhabitants became even more specialized in procuring needed resources during this period in response to population pressure, focusing on marshlands of the Delta area where the Sacramento and San Joaquin Rivers meet because of its rich food resources. The acorn also became a predominant food source. People began to settle in long-term villages around permanent sources of water to collect and intensely process nearby resources.

The Berkeley Pattern is the cultural trend marking the Middle Horizon. This pattern is reflected in the archaeological record by numerous ground stone artifacts used for exploiting the acorn as a staple, and stone tool technology that had

[4] Moratto, M.J., 1978. *Archaeology and California's Climate.* California Indian Library Collections, Berkeley, CA.

[5] Fredrickson, D.A., 1973. *Early Cultures of the North Coast Ranges, California.* Ph.D. dissertation. Davis, CA: Department of Anthropology, University of California, Davis.

[6] Moratto, M.J., 2004. *California Archaeology.* Orlando, FL: Coyote Press, Salinas, CA.

become more specialized. A more localized population and resource base led to more trade relationships, evidence of which is seen in shells and certain types of stone tools.

iii. Late Horizon: AD 500–1769

The late horizon shows the results of the ever-increasing population and localized settlement patterns. Group territories continued to become smaller and more defined, and social patterns in the activities, relationships, belief systems and material culture continued to develop during this period, taking forms similar to those described by the first Europeans that entered the area.

The dominant cultural pattern in the Late Horizon is the Augustine Pattern.[7] Archaeological sites representing the Augustine Pattern show more specialized technology, such as artifacts of composite materials, detailed stone and shell work, basketwork, and ceramic production. Small figurines, smoking pipes, and clam shell disk beads (which were traded as currency) are evidence of complex social and economic institutions. Small projectile points represent the use of the bow and arrow.

b. Southern Cascades

Researchers have defined the cultural sequence based on the archaeological record for the Southern Cascade foothills in the northern portion of Butte County to include five phases that span 4,000 years: Deadman, Kingsley, Dye Creek, Mill Creek, and Ethnographic. [8,9] Like the Central Valley phases, as time went on, the material culture reflected increased complexity.

The Deadman Complex (circa 3,450–2,450 before present [BP]) is characterized by large side-notched, leaf-shaped and stemmed basalt projectile points and the presence of manos and metates. The Kingsley Complex (2,450–1,450 BP) is generally represented by large stemmed and corner-notched projectile points made primarily out of basalt, scoop *Olivella* shell beads, flat bone tools, and a greater

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[7] Fredrickson, D.A., 1973. *Early Cultures of the North Coast Ranges, California.* Ph.D. dissertation. Davis, CA: Department of Anthropology, University of California, Davis.

[8] Johnson, J.J, no date. Archaeological Investigations in Northeastern California (1939–1979). Master's thesis. Sacramento, CA: California State University, Sacramento.

[9] Johnson, J.J, no date. Archaeological Investigations in Northeastern California (1939–1979). Master's thesis. Sacramento, CA: California State University, Sacramento.

variety of groundstone tools for plant processing. The Dye Creek Complex (1,450–450 BP) is characterized by an increased variety of shell beads and ornaments; the groundstone assemblage is similar to that of the Kingsley Complex. Projectile points included large, serrated points of obsidian and basalt. The Mill Creek Complex (450–100 BP) is characterized by the presence of even greater shell bead varieties, as well as twined basketry and more ubiquitous groundstone tools. Projectile point types include small triangular points of obsidian and occasionally silicates.

The Ethnographic Complex (1845–1911 AD) consists of a large majority of the items of the prehistoric Mill Creek Complex and miscellaneous artifacts of Euro-American manufacture. A type of rock art called pitted boulder petroglyphs are frequently found in association with ethnographic village sites of the Yana and Konkow, existing descendant communities in the area.

c. Northern Sierra Nevada

The cultural chronology first developed for the northern Sierra Nevada in the eastern portion of Butte County identified two time periods marked by different cultural complexes: the Martis Complex and the Kings Beach Complex.[10] The earlier Martis Complex was characterized by large spear points made almost exclusively of basalt, millingstone and mortar and pestle technology, and food sources of large game and seeds. The later Kings Beach Complex was marked by the use of obsidian and chert for smaller flaked-stone tools, the use of bedrock mortars for processing acorns and other plant resources, and greater reliance on fishing and collecting nuts and seeds rather than hunting.[11]

Later researchers refined the cultural sequence of the Martis-Kings Beach Complexes.[12] The Washoe Lake Phase (before 10,000 BP) is the earliest known evidence of humans in the area, represented by fluted projectile points. People were thought to have been highly mobile during this time. The Tahoe Reach Phase

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[10] Elsasser, A. B., 1960. The Archaeology of the Sierra Nevada in California and Nevada. Berkeley, CA: University of California Archaeological Survey Report 51:1–93..

[11] Jackson, R.J., T.L. Jackson, C. Miksicek, K. Roper, and D. Simons, 1994. *Framework for Archaeological Research and Management on the National Forests of the North-Central Sierra Nevada*. Unit 1, Volume B. BioSystems Analysis, Inc. Submitted to the U.S. Forest Service, Eldorado National Forest.

[12] Elston, R.G., 1979. The Archaeology of U.S. 395 Right-of-Way Corridor Between Stead, Nevada and Hallelujah Junction, California. Report submitted to the

(10,000–8,000 BP) is characterized by large-stemmed points used to hunt a variety of mammals and only occasional groundstone artifacts, indicating more focus on hunting than on plant resources. The Spooner Phase (8,000–5,000 BP) has very few artifacts that can be definitively dated to the time period. The Early (5,000–3,000 BP) and Late (3,000–1,300 BP) Martis Phases are well-defined in the archaeological record, implying a significant increase in human population in the region. While grinding artifacts and house pits remain similar through the two phases, the differences are marked by changes in projectile point styles. The Early Kings Beach Phase (dates vary) marks the introduction of the bow and arrow to the region, while the Late Kings Beach Phase is represented by a decrease in archaeological sites and features, possibly indicating a change in settlement patterns.

2. Ethnographic Context

Butte County includes the territories of four Native American groups, the Maidu (mountain Maidu), the Nisenan (southern Maidu), the Konkow (northwestern Maidu) and the Yana. While there is some overlap, their territories are generally well-defined in the Butte County area, based on the areas each tribe occupied up to Euro-American contact. The Maidu territory is located at the approximate boundary between the northern Sierra Nevada and southern Cascade Range and includes mountain valleys from Honey Lake to Lassen Peak. To the south, the Nisenan territory extends from the banks of the Sacramento River across the lower Feather River drainages to the crest of the Sierra. The Konkow territory includes Feather River area west of Richbar and extends to the southwest almost to the Sutter Buttes, and the Sacramento River area from about Butte City on the south to Butte Meadows on the north. The Yana territory extends from the edge of the Sacramento Valley east to the crest of the Cascades and northern Sierra.[13]

[13] Johnson, J.J., 1978. Yana. In R. F. Heizer, ed., *Handbook of North American Indians*. Vol. 8, *California*:361–369. (W. C. Sturtevant, general ed.) Washington, DC: Smithsonian Institution.

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a. Maidu

Maidu society was focused at the village level, with a village generally containing about seven households.[14] Village communities consisted of several adjacent villages and usually occupied a single valley. Where winter weather allowed it, permanent villages were established. In other areas, villages were occupied on a seasonal basis. An individual's connection was to the village community, and group differentiation was primarily determined by geographical location. Community boundaries were guarded and defended. Warfare could take place between individual villages or between village communities and generally consisted of raiding or ambushes.[15]

The community leader of the main village was a headman with no strict political control, chosen for maturity, wealth, ability, and generosity.[16] A large assembly chamber, or dance house, was located within the headman's village to accommodate members of the community for ceremonial and subsistence activities.[17]

Each village was self-sufficient and used a seasonal hunter-gathering strategy to exploit a wide range of plant and animal resources to provide for the needs of the village. Plant food sources included acorns, seeds, roots, berries, and bulbs; the acorn was the most important of these foods. Both individual hunts and group hunts were organized for bear or deer. Additional food sources included large and small game, fish, eel, and various insects. Other resources included materials for manufacturing tools and weaving basketry. Generally, all land was communally

[14] Riddell, F.A., 1978. Maidu and Konkow. In R. F. Heizer, volume ed., Handbook of North American Indians. Vol. 8, California:370–386. Washington DC: Smithsonian Institution.

[15] Kroeber, A.L., 1925. *Handbook of the Indians of California.* (Bulletin No. 78.) Washington, DC: Bureau of American Ethnology, Smithsonian Institution. Reprinted in 1976. New York: Dover Publications.

[16] Kroeber, A.L., 1925. *Handbook of the Indians of California.* (Bulletin No. 78.) Washington, DC: Bureau of American Ethnology, Smithsonian Institution. Reprinted in 1976. New York: Dover Publications.

[17] Kroeber, A.L., 1925. *Handbook of the Indians of California.* (Bulletin No. 78.) Washington, DC: Bureau of American Ethnology, Smithsonian Institution. Reprinted in 1976. New York: Dover Publications.

owned and accessible to all members of the community for gathering and hunting purposes.[18]

b. Nisenan

Nisenan villages were usually located on low rises along major watercourses, and ranged in size from three houses to 40 or 50. Houses were domed structures covered with earth and tule or grass. Brush shelters were used in the summer and at temporary camps during food-gathering rounds. Larger villages often had semi-subterranean dance houses that were covered in earth and tule or brush. Another common village structure was a granary used for storing acorns.[19]

The Nisenan groups that lived in permanent settlements set out seasonally to gather resources from the surrounding ecosystem. The acorn crop from the blue oak (*Quercus douglasii*) and black oak (*Q. kelloggii*) was so carefully managed that its management served as the equivalent of agriculture. Acorns were stored in anticipation of winter shortfalls. Deer, rabbit, and salmon were the chief sources of animal protein, but many other insects and animals were used as well.

Religion played an important role in Nisenan life. The Nisenan believed that all natural objects were endowed with supernatural powers. Two kinds of shamans existed: curing shamans and religious shamans. Curing shamans had limited contact with the spirit world and diagnosed and healed illnesses. Religious shamans gained control over the spirits through dreams and esoteric experiences.[20]

c. Konkow

Konkow groups were organized by tribelet. A tribelet was composed of several villages. When needed for group decisions or group activities, the headman of one of the villages in a tribelet was selected to be the leader of all the villages

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[18] Kroeber, A.L., 1925. *Handbook of the Indians of California*. (Bulletin No. 78.) Washington, DC: Bureau of American Ethnology, Smithsonian Institution. Reprinted in 1976. New York: Dover Publications..

[19] Wilson, N.L. and A.H. Towne, 1978. Nisenan. In R. F. Heizer, ed., *The Handbook of North American Indians*. Vol. 8, *California*:387–397. (W. C. Sturtevant, general ed.) Washington DC: Smithsonian Institution.

[20] Wilson, N.L. and A.H. Towne, 1978. Nisenan. In R. F. Heizer, ed., *The Handbook of North American Indians*. Vol. 8, *California*:387–397. (W. C. Sturtevant, general ed.) Washington DC: Smithsonian Institution.

composing the tribelet. Headmen primarily acted as advisors and were chosen by a shaman for qualities such as wealth, maturity, ability, and generosity.[21]

The basic subsistence strategy of the Konkow was seasonally mobile hunting and gathering. Acorns, the primary staple, were gathered in the valley, along with seeds, buckeye, salmon, insects and a wide variety of other plants and animals. During the warmer months, people moved to mountainous areas to hunt and collect food resources from higher elevations, such as pine nuts.[22]

d. Yana

Yana territory was divided among numerous tribelets, each consisting of a major village with a principal chief and assembly house and several allied villages. The chief's position was hereditary, but the chief's authority was limited to making suggestions, without the power of control or command. The southern Yana lived in single-family dwellings consisting of a conical framework of poles covered with slabs of bark built over a shallow, oval depression in the earth. [23]

The Yana gathered a wide variety of resources and ate a variety of plant foods, including acorns, berries, seeds, roots, tubers, and bulbs. The acorn, harvested in September and October, was the most important of all resources. Of the various game animals hunted, deer were the most important. Rodents and some insects were a part of the Yana diet, as were fish such as salmon, trout, and suckers.[24]

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[21] Riddell, F.A., 1978. Maidu and Konkow. In R. F. Heizer, volume ed., Handbook of North American Indians. Vol. 8, California:370–386. Washington DC: Smithsonian Institution.

[22] Riddell, F.A., 1978. Maidu and Konkow. In R. F. Heizer, volume ed., Handbook of North American Indians. Vol. 8, California:370–386. Washington DC: Smithsonian Institution.

[23] Johnson, J.J., 1978. Yana. In R. F. Heizer, ed., *Handbook of North American Indians*. Vol. 8, *California*:361–369. (W. C. Sturtevant, general ed.) Washington, DC: Smithsonian Institution.

[24] Johnson, J.J., 1978. Yana. In R. F. Heizer, ed., *Handbook of North American Indians*. Vol. 8, *California*:361–369. (W. C. Sturtevant, general ed.) Washington, DC: Smithsonian Institution.

Despite feuds with neighboring tribes, trade did take place between the Yana and their adjacent neighbors. Goods acquired by the Yana included obsidian, arrows, quivers, buckskin, and arrow points. In trade, the Yana supplied deer hides, salt, buckskin, and baskets.[25]

3. Historic Context

a. Butte County

Butte County is situated on the east side of the Sacramento Valley and is bounded by the Sacramento River to the west and the Sierra Nevada to the east.[26] Butte was one of the original 27 counties created when California became a state in 1850. The County initially included all the lands of Plumas County, as well as large portions of Lassen and Tehama Counties. The present county limits, established in 1923, abut Glenn and Colusa Counties to the west, Tehama County to the north and northwest, Plumas County to the east, Sutter County to the south, and Yuba County to the southeast.[27] The original county seat was located in Hamilton, a former mining town. In 1853, the seat moved to Bidwell's Bar (another mining camp and now under Lake Oroville); in 1856, it moved again to the current location of Oroville.[28]

Butte County is basically a rural county, with Biggs, Chico, Gridley, Durham, Paradise, and Oroville representing (roughly) six of the largest communities. The lack of any real major mineral deposits, such as coal or iron, as well as the county's distance from major commercial centers, has contributed to the overall rural development of the county. Residents historically have relied on agriculture, lumber, and some mining to subsist.

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[25] Johnson, J.J., 1978. Yana. In R. F. Heizer, ed., *Handbook of North American Indians*. Vol. 8, *California*:361–369. (W. C. Sturtevant, general ed.) Washington, DC: Smithsonian Institution.

[26] Phillips, E. and J.H. Miller, 1915. Sacramento Valley and Foothill Counties of California: An Illustrated Description of All the Counties Embraced in this Richly Productive Geographical Subdivision of the Golden State. Sacramento, CA: Sacramento Valley Expositions Commission.

[27] Coy, O.C., 1923. *California County Boundaries*. California Historical Survey Commission, Berkeley, CA.

[28] Gudde, E.G., 1969. California Place Names: the Origin and Etymology of Current Geographical Names. Berkeley, CA: University of California Press.

b. Early Exploration

Spaniards explored parts of Butte County as early as 1808. Gabriel Moraga guided an expedition up north, along the Calaveras, Mokelumne, Cosumnes, American and Sacramento Rivers, in search of potential inland mission sites. In 1820, a party led by Luis Arguello passed through the region as far north as the Columbia River.[29]

During the early 1800s, hunters and trappers, such as Jedediah Strong Smith and a group of Hudson's Bay Company trappers, explored the present-day Butte County. The hunters found the banks of the rivers and streams rich with beavers, otters, and other animals whose pelts were highly valuable commodities in the worldwide trade of the time. The region remained outside the mainstream of both Mexican and American settlement until the California gold rush of 1848.[30]

c. Mining

The discovery of gold in 1848 brought an influx of gold seekers to the region. Thousands of miners descended upon the area and set up transitory encampments, such as Bidwell Bar, Long Bar and Hamilton, along the Feather River where some gold was discovered. During the next 70 years, gold mining in some form remained the primary economic activity in Butte County.

The Feather River was largely the site of placer mining in the mid-19th century, but as time wore on, mining techniques changed and evolved. More labor-intensive methods such as river mining, drift mining, hydraulic mining and dredging soon replaced simple placer mining. Quartz mining also occurred but to a lesser degree. The more labor-intensive mining techniques necessitated the building of dams, ditches, and flumes that in turn required extensive labor. Mining and ditch companies soon established themselves in the area to oversee the construction of major mining activities, including the building of numerous ditch systems. Mining continued until the 1880s, when the number of miners throughout the county

[29] McGie, J.F., 1982a. *History of Butte County, Volume I: 1840–1919.* Oroville, CA: Butte County Board of Education.

[30] McGie, J.F., 1982a. *History of Butte County, Volume I: 1840–1919.* Oroville, CA: Butte County Board of Education.

decreased largely as a result of the end of hydraulic mining. This, along with the collapse of the wheat industry, led to a general depression and decline in the county's overall population.[31]

During the early 20th century, dredge mining became popular in the Feather River near the City of Oroville and farther south. At the height of dredge mining, more than 40 dredges were operating in the river and bringing prosperity to Oroville. As a result, the Town enjoyed a population boom, increasing from 1,787 to 3,859 persons between 1890 and 1910. Mining activity gradually declined during the following decades as deposits began to be played out. Gold mining continued until 1942, when the War Production Board closed all mines in the region.[32]

d. Settlement

Prior to the gold rush of 1848, only a handful of ranches scattered on the Mexican land grants in the Sacramento Valley area comprised the few settlements in the region. During the 1850s and 1860s, much of Butte County was settled with small farms, where settlers raised wheat; vegetables; livestock; and cultivated orchards that included apples, peaches, pears, figs, citrus, and olives. Wheat became the prevalent crop during this period and dominated the agriculture of the county for much of the remainder of the century until the state experienced an overall decline in the 1890s as a result of the wheat bust.[33]

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[31] Walker, M., M. Selverston, and M. Markwyn, 2005. Archaeological and Historical Resources Inventory Report, Oroville Facilities Relicensing, FERC Project 2100. Rohnert Park, CA: Anthropological Studies Center, Sonoma State University. Prepared for the Department of Water Resources, the Resources Agency, State of California.

[32] Walker, M., M. Selverston, and M. Markwyn, 2005. Archaeological and Historical Resources Inventory Report, Oroville Facilities Relicensing, FERC Project 2100. Rohnert Park, CA: Anthropological Studies Center, Sonoma State University. Prepared for the Department of Water Resources, the Resources Agency, State of California.

[33] Walker, M., M. Selverston, and M. Markwyn, 2005. Archaeological and Historical Resources Inventory Report, Oroville Facilities Relicensing, FERC Project 2100. Rohnert Park, CA: Anthropological Studies Center, Sonoma State University. Prepared for the Department of Water Resources, the Resources Agency, State of California.

By the early 20th century, Butte County served as a major fruit and nut-producing region. During this period, land holdings increased in number yet declined in overall acreage. While the number of farms increased from 1,179 to 2,603, the average farm decreased from 574.3 to 238 acres.[34]

i. Oroville

Oroville (originally Ophir) was built on flat land below the junction of the forks of the Feather River. It was originally established as a mining camp during the Gold Rush and gradually developed into a trading center for mining and then for lumbering and agricultural goods. In 1856, state officials designated Oroville as the county seat. As the local economy shifted from mining-based activities to agricultural-based activities, numerous canneries and processing plants opened in town. By the 1880s, Oroville was home to numerous establishments, including a grocery store, a dry-goods store, a drug store, a bank, a brewery, and several saloons.[35] Oroville continues to serve as a steady economic and social focal point into the present day, with a 2020 population of approximately 19,400.[36]

ii. Chico

The City of Chico is named after Rancho Chico, which John Bidwell, a prominent California politico, purchased from William Dickey and Edward A. Farwell, the original grantees, in the late 1840s. In 1860, Bidwell founded the town of Chico and later donated land for the Northern Branch State Normal School. The school became California State University, Chico and, as it was when it was founded, remains the center of the community. After Bidwell's death, his wife, Annie, donated 1,900 acres of the ranch to the City of Chico, which became Bidwell Park.[37] Today, Chico has a population of approximately 110,300.[38]

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[34] Walker, M., M. Selverston, and M. Markwyn, 2005. Archaeological and Historical Resources Inventory Report, Oroville Facilities Relicensing, FERC Project 2100. Rohnert Park, CA: Anthropological Studies Center, Sonoma State University. Prepared for the Department of Water Resources, the Resources Agency, State of California.

[35] Walker, M., M. Selverston, and M. Markwyn, 2005. Archaeological and Historical Resources Inventory Report, Oroville Facilities Relicensing, FERC Project 2100. Rohnert Park, CA: Anthropological Studies Center, Sonoma State University. Prepared for the Department of Water Resources, the Resources Agency, State of California.

[36] Butte County Association of Governments 2020: http://www.bcag.org/Planning/Socio-Economic-Data/Population-Estimates---2020/index.html.

[37] Kyle, D.E., 1990. *Historic Spots in California.* Stanford, CA: Stanford University Press.

iii. Paradise

The area surrounding the Town of Paradise was first settled during the Gold Rush by miners searching for gold along the Feather River and Butte Creek. It was not until 1877, when a post office with the name of Paradise was established where the present town is located, that the small agriculturally focused settlement began to have the features of a town. By 1880, the United States Census listed the small community as "Paradise Ridge." After the Butte County Railroad was completed in 1902, the town's population began to expand, and it became the center of the apple industry in Butte County.[39]

In the 1910s, additional development occurred in Paradise and more families settled there to begin farming. The Paradise Irrigation District was formed in 1916 due to lack of a reliable water supply during the summers. The irrigation district built the Magalia Dam on Little Butte Creek. Farmers grew apples, prunes, and pears, and the town's location on the Butte County Railroad helped farmers transport their produce to market.[40] Currently, the population is approximately 4,600, reduced from 26,300 following the 2018 Camp Fire.[41]

iv. Gridley

The early settlement of Gridley was surrounded by dry farms of wheat, oats, and barley in the 1850s and 1860s. The town of Gridley was officially established after the California and Oregon Railroad constructed an alignment through the area in 1870. The town was constructed on property owned by George W. Gridley, a prominent agriculturalist in Butte County.[42] Citizens created a canal system in 1902 that tapped into the Feather River and brought water for irrigation to the farms and ranches. This new irrigation system allowed farming in the area to diversify and provided for farming on a smaller scale by individual families. A population influx

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[38] Butte County Association of Governments 2020: http://www.bcag.org/Planning/Socio-Economic-Data/Population-Estimates---2020/index.html

[39] McDonald, Lois, 2000. *This Paradise We Call Home* Paradise: Gold Nugget Museum, 2000.

[40] Colby, Robert. 2006. *Images of America: Paradise*. Published by Arcadia Publishing Incorporated, South Carolina.

[41] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011-2020. Sacramento, California, May 2020.

[42] Wells, Harry L. and W.L., 1882. Chambers, History of Butte County California San Francisco: Harry L. Wells.

followed; many of these early settlers and farmers were members of the Mormon Church. By the early twentieth century there was a large Mormon community in Gridley that settled south of present-day Little Street. Gridley was incorporated in 1906.[43] The current population is approximately 6,400.[44]

v. Biggs

Like the town of Gridley, the town of Biggs was established when the California and Oregon Railroad constructed an alignment through the area in 1870. In that year, a post office and store were located in the town, and the town's namesake, Marion Biggs, shipped the first grain out. The town grew slowly but, by the 1880s, was the third biggest town in Butte County.[45] The current estimated population is 1,900.[46]

e. Development

i. 19th Century

Throughout the latter part of the 19th century, Butte County enjoyed a steady growth in population, largely because of the establishment of lumber, mining (primarily gold and diamond), and hydroelectric power industries. The continued growth and success of agriculture and the introduction of fruit-canning operations in particular, contributed to the economic development of the region. Crops produced in the county included hay, citrus fruits, vegetables, nuts (primarily almonds), grapes, berries, apples, plums, pomegranates, figs, melons, cherries, and olives.[47]

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[43] The Reunion Committee. 1980. *History of the LDS Church in the Gridley, California Area.* Mc Dowell Printing, Gridley, California.

[44] Butte County Association of Government. 2020. http://www.bcag.org/Planning/Socio-Economic-Data/Population-Estimates---2020/index.html

[45] Wells, Harry L. and W.L., 1882. Chambers, History of Butte County California San Francisco: Harry L. Wells.

[46] Butte County Association of Government. 2020. http://www.bcag.org/Planning/Socio-Economic-Data/Population-Estimates---2020/index.html

[47] Phillips, E. and J.H. Miller, 1915. Sacramento Valley and Foothill Counties of California: An Illustrated Description of All the Counties Embraced in this Richly Productive Geographical Subdivision of the Golden State. Sacramento, CA: Sacramento Valley Expositions Commission.

A major employer in the area was the Diamond Match Company, which opened a plant in Chico in 1902 to make matches and other wood products. The company established a lumber mill east of Magalia, in the mountains, and constructed the Butte County Railroad in 1903 to transport lumber from the mill to Chico. Although established primarily to transport lumber, the passenger and freight service offered by the Butte County Railroad stimulated growth in the communities along the route.[48] The construction of the Northern Electric Railroad (later the Sacramento Northern Railroad) in 1905 and the Western Pacific Railroad (part of the transcontinental railroad system) in 1910 further stimulated the region's growth and development.[49]

ii. 20th Century

Manufacturing and service industries continued to flourish during the early 20th century as Butte County struggled to meet the demands of World War I. The influx of people to the area also created pressure to construct new housing. Butte County's economy suffered through the Depression years with the rest of the nation, later to be rejuvenated by the onset of World War II. During those years, the county poured its energies into the war effort, and, once the conflict ended, Butte County citizens redirected their attention to the home front. Beginning in the late 1940s and into the 1950s, Butte County embarked on a long-postponed construction project that involved building churches, schools, and housing, as well as improving the infrastructure for the growing population.[50]

By the 1950s, the economy throughout the county was booming with the continued success of the Diamond Match Company; the construction of the Oroville Dam (completed in 1968); and the thriving agriculture, canning, lumber, and wood-processing enterprises. Other local industries included the manufacture of lead tube containers and prefabricated houses, structural steel fabrication, olive processing, sugar manufacturing, rice milling, walnut and almond processing and dairy processing. Agriculture continued to be the primary industry of the county in terms of production and growth. Major crops produced were almonds, olives, walnuts, citrus fruits, and rice, as well as peaches, prunes, grain, and hay. Overall,

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[48] Mansfield, G., 1918. *History of Butte County.* Historic Record Company, Los Angeles, CA.

[49] Robertson, D., 1998. *Encyclopedia of Western Railroad History.* Volume IV, *California.* Caldwell, IN: Caxton Publishing.

[50] McGie, J.F., 1982b. *History of Butte County, Volume II: 1920–1980.* Oroville, CA: Butte County Board of Education.

during the postwar period, Butte County experienced a 30-percent growth in business. The county's population grew from 42,840 in 1940 to 82,030 by 1960.[51]

f. Transportation

i. U.S. Highway 99

Historic U.S. Highway 99 traveled from the Mexican border north toward Sacramento, where it split into U.S. Highway 99W and U.S. Highway 99E. The two parts rejoined in Red Bluff and generally followed the current Interstate 5 (I-5) route north toward the Oregon/California border. It was originally a dirt and gravel road, but highway officials paved the alignment by the late 1920s when it became one of the first highways commissioned in the nation. U.S. Highway 99 functioned as the main artery along the West Coast until it was largely bypassed in the 1960s by the newly constructed I-5. Between the late 1960s and early 1970s, U.S. Highway 99 was decommissioned and relegated to secondary highway status.

Although U.S. Highway 99 traveled through the Central Valley as early as 1926, for many years it skirted Chico by traveling up to, but not through, the city. By 1955, the State had relocated U.S. Highway 99E through Chico. This newer segment traveled southwest of the current route along the historic Esplanade. Despite public opposition, the state rerouted the highway again in the early 1960s, to alleviate traffic congestion. Chico residents hotly disputed the new highway because it bisected Bidwell Park and traveled through an established residential district. The new alignment (which travels through the project area) is supported by a 20-foot-high earth-filled dike and cuts through 8 acres of parkland.[52]

g. Hydroelectric Power

Mining spurred the initial development of hydroelectric power facilities in California; many mining operations used water-generating plants to operate equipment powered by electricity, including hoists and dredges. Large hydropower interests such as Great Western Power began investing in hydroelectric infrastructure development; in 1930, PG&E bought the company and its interests such as Big Bend Powerhouse.[53] The Feather River was widely considered an ideal

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[51] McGie, J.F., 1982b. *History of Butte County, Volume II: 1920–1980.* Oroville, CA: Butte County Board of Education.

[52] California Department of Transportation 1918, 1936, 1963; San Francisco Examiner 1962; Sheridan 1955.

[53] Federal Energy Regulatory Commission. 2006. *Draft Environmental Impact Statement for Hydropower License, Oroville Facilities – FERC Project No. 2100.* September. FERC

waterway to house hydropower facilities, and in the mid-twentieth century, plans were laid by State government and agencies to construct these facilities near Oroville.

i. Oroville Dam and Thermalito Water Diversion and Power Generation Structures

In order to meet the power and water needs of the expanding regional population and Butte County economy, the State of California proposed the construction of the Oroville Dam and associated facilities in 1951; they were completed by 1968.[54,55] The Oroville facilities consist of: the Oroville Dam and reservoir; Hyatt Pumping-Generating Plant; Thermalito Diversion Dam, Power Plant, and Power Canal; fish barrier dam and Feather River Fish hatchery; Thermalito Forebay, Dam, and Thermalito Pumping-Generating Plant; Thermalito Afterbay Dam and outlet; and transmission lines. An average of 2.2 billion kilowatt-hours of electricity are produced by the Orville Facilities annually.[56] The Lake Oroville storage reservoir has a capacity of approximately 3.5 million acre-feet of water and is host to a range of recreational activities.

h. Wildfire Management and Wildfire Impacts to Cultural Resources in Butte County

In November 2018, a wildfire began on Camp Creek Road in Pulga, approximately 10 miles east of Paradise. The wildfire, known as the Camp Fire, burned approximately 153,000 acres, consuming parts of the communities of Butte Creek Canyon, Concow, Magalia, and Upper Ridge in unincorporated northern Butte

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[54] California Department of Water Resources: https://water.ca.gov/Programs/State-Water-Project/SWP-Facilities/Oroville. Accessed February 5, 2021.

[55] Federal Energy Regulatory Commission. 2006. *Draft Environmental Impact Statement for Hydropower License, Oroville Facilities – FERC Project No. 2100.* September. FERC Office of Energy Projects, Division of Hydropower Licensing. 888 First St. NE, Washington, DC 20426.

[56] Department of Water Resources. 2021. *Oroville Facilities.* https://water.ca.gov/Programs/State-Water-Project/SWP-Facilities/Oroville/HLPCO-Oroville-Facilities-Project-2100, accessed February 5, 2021.

County and almost completely destroying the Town of Paradise.[57] The wildfire destroyed over 14,500 structures and was responsible for the deaths of 87 people.[58]

In August 2020, the North Complex Fire was sparked during a lightning storm. The North Complex Fire ravaged the southeast portion of the county and caused the death of 16 people and destruction of 2,445 additional structures, primarily in the Berry Creek and Feather Falls communities.[59]

Prior to the Camp Fire, twelve additional formidable wildfires burned within the same area as the Camp Fire since 1999.[60] As drought, beetle infestation, and disease have intensified across Sierra Nevada Mountain forests, wildfires have become increasingly more frequent and larger since 1950.[61]

The effects of wildfire on cultural resources, while variable by environmental context, are largely more severe due to the combined effects of unchecked high-temperature flames and flame suppression methods.[62] An unknown number of cultural resources were destroyed as a result of the Camp and North Complex Fires alone.

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[57] Hagerty, Colleen. 2019. The Camp Fire, one year later. Article published October 23, 2019. Vox. https://www.vox.com/the-highlight/2019/10/16/20908291/camp-fire-wildfire-california-paradise-survivors., accessed February 5, 2021.

[58] Butte County District Attorney, *The Camp Fire Public Report: A Summary of the Camp Fire Investigation*, June 16, 2020, https://www.buttecounty.net/Portals/30/CFReport/PGE-THE-CAMP-FIRE-PUBLIC-REPORT.pdf?ver=2020-06-15-190515-977

[59] U.S. Forest Service, Plumas National Forest, North Complex Fire Update, December 4, 2020, https://inciweb.nwcg.gov/incident/6997/

[60] Gafni, Matthias. 2018. *Rebuild Paradise? Since 1999, 13 large wildfires burned in the footprint of the Camp Fire.* The Mercury News, December 3.

[61] Butte County. 2018. *Community Demographics and Fire History Map.* https://www.buttecounty.net/fire Accessed February 5, 2021.

[62] Winthrop, Kate. No Date. *Bare Bones Guide to Fire Effects on Cultural Resources, for Cultural Resource Specialists*. Produced for Bureau of Land Management. Published by National Parks Service. https://www.nps.gov/archeology/npsGuide/fire/docs/8%20Bare%20Bones%20Guide%20to%20Fire%20Effects%20on%20CR-BLM(Winthrop).pdf, Accessed February 6, 2021.

C. Existing Conditions

1. Known Cultural Resources

A general countywide record search was requested and conducted at the Northeast Information Center (NEIC) of the California Historical Resources Information System at California State University, Chico. Specifically, the NEIC keeps records of known archaeological and architectural sites and studies on U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps. All of the USGS maps covering Butte County were consulted by NEIC staff. This information provided the basis for the basic archaeological-sensitivity assessment of Butte County, discussed later in this report. Additionally, NEIC consulted the following sources: Office of Historic Preservation (OHP) historic property listings, California State Archaeological Determinations of Eligibility, NEIC historic resources maps, California Inventory of Historic Resources, *California Place Names,*[63] *California Gold Camps,*[64] Caltrans Historic Bridge Inventory, California Historical Landmarks (1996), California Points of Historical Interest (1992) *Historic Spots in California,*[65] and the Butte County Built Environment Resources Directory.

a. Archaeological Resources

Of the 4,008 archaeological sites recorded in Butte County, 2,155 sites are either prehistoric archaeological resources or include a prehistoric archaeological component. There are 1,853 sites that are historic period sites. According to 2012 data from the California Office of Historic Preservation, a total of 40 archaeological sites are listed on or have been formally recommended eligible for listing on the National Register of Historic Places (and therefore by default on the California Register of Historical Resources). Of these, 31are prehistoric archaeological sites, 3 are historic period archaeological sites, and 6 are archaeological sites that contain both prehistoric and historic period components. The most current Archaeological Determinations of Eligibility listing dates to 2012.

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[63] Gudde, E.G., 1969. California Place Names: the Origin and Etymology of Current Geographical Names. Berkeley, CA: University of California Press.

[64] Gudde, E.G., 1969. California Place Names: the Origin and Etymology of Current Geographical Names. Berkeley, CA: University of California Press.

[65] Kyle, D.E., 1990. *Historic Spots in California.* Stanford, CA: Stanford University Press.

i. Prehistoric Archaeological Resources

Previous studies in the general region provide reasonable expectations for the range of archaeological property types likely to occur in Butte County. Prehistoric site types include habitation sites, limited occupation sites, hunting/processing camps, lithic reduction stations, milling stations, quarries/single reduction locations, rock-art sites, bedrock milling features and burial locations. Sites may fall into more than one category. For example, habitation sites may be associated with rock art. Therefore, sites may be classified as more than one site type.

Habitation sites are locations of long-term occupation. These sites were typically located near streams and springs, which are abundant in Butte County. Habitation sites are characterized by midden deposits and a variety of artifacts (flaked-stone debitage, bifaces, unifaces, other flaked-stone tools, ground-stone implements and fire-affected rock).

Temporary camps are distinguished from habitation sites by the absence or limited development of midden deposits. Archaeological deposits at temporary camps are typically shallow or restricted to the surface and are limited principally to ground-stone tools, flaked-stone tools and debitage (in approximate descending order of frequency).

Lithic scatters are collections of flaked- or ground-stone debris, including tools and debitage that relate to post-quarry reduction and tool manufacturing efforts. They are perceived primarily as daily or overnight task-oriented camps where a limited range of activities was conducted.

The most common prehistoric site type found in the Butte County area is temporary occupation sites. Other site types found in the area include hunting/processing camps, lithic scatters, milling stations sites, habitation sits, quarry/single reduction loci and rock art sites.

The overall prehistoric archaeological sensitivity of Butte County is generally considered high, particularly in those areas near water sources or on terraces along watercourses. In particular, the Sacramento River and Feather River watersheds among the Sierra foothills possess river terraces that are rich in archaeological resources. In the Oroville area where the forks of the Feather River converge, the archaeological site density is some of the highest in California; at least 500 sites have been recorded in this area between 2005 and 2006 alone and reported to the NEIC. In general, the lands on the margins of the Sacramento River and other major waterways are sensitive for prehistoric archaeological resources. Prehistoric archaeological sites often are located along riverbanks in the Sacramento Valley, although they usually are found on natural rises that protected the inhabitants from frequent floods. Sites along the Sacramento River and other major drainages in Butte County do exist, and the possibility remains that additional prehistoric deposits may be buried in similar locations, in natural buried contexts (such as under alluvial deposits) as well as cultural buried contexts (such as below constructed levees or mixed in as a portion of levee fill material).

ii. Historic-Period Archaeological Resources

Historic site types include old transportation corridors and alignments, remnants of activities associated with historic homesteading, ranching and agriculture, mining, and commerce. The overall historic archaeological sensitivity of Butte County area is generally considered moderately high in those areas where historic records indicate transportation routes, agricultural settlements and mining occurred.

b. Built Environment

Historic cultural resources generally include buildings, roads, trails, bridges, canals, and railroads usually associated with the time period beginning with the first EuroAmerican contact. Because settlement of Butte County dates to the 1840s, the county is rich in historic cultural resources. In general, concentrations of historic resources in the county are expected to occur adjacent to transportation corridors (historic highways, railroads, navigable waterways); on historic ranches; in areas of historic rock, soil, mineral and timber extraction; and within historic neighborhoods and business districts.

i. Historic Properties in State Database and the Built Environment Resources Directory

The Historic Property Data File Historic Resources Inventory (HRI), which is maintained by the State Office of Historic Preservation, identifies properties that have been recorded and whether those properties are considered eligible or ineligible for listing in the National Register of Historic Places. The listing for Butte County indicates that over 1,000 properties within the county have been inventoried at some level. This includes several hundred archaeological or built environment resources that are listed or appear to meet the criteria for listing in the National Register. In general, listing a property in the NRHP involves submission of a formal nomination form that requires concurrence from SHPO, the State Historical Resources Commission and the Keeper of the National Register. Properties that are evaluated and found, with SHPO concurrence, to be eligible for listing under one or more of the NRHP criteria but are never nominated, are afforded the same protections for federally funded projects as listed properties. As noted previously, properties listed or found eligible for listing are also automatically eligible for the California Register of Historical Resources. The HRI also includes buildings that have been identified as historically significant by local government agencies.

The Built Environment Resources Directory (BERD) provides information regarding non-archaeological resources in the Office of Historic Preservation's Inventory. The listing for Butte County indicates that 993 built environment resources have been inventoried at some level; many of these overlap with the HRI listings. Eligibility status listed in the BERD is current as of 2020. An overview of the total numbers and types of properties recorded by region in Butte County, and of properties determined or presumed eligible for the NRHP, CRHR, or local listing in Butte County is discussed briefly below.

a) Oroville Area

Surveys have identified 108 buildings and structures in the Oroville area, including several in the Old Oroville Commercial District; 73 are listed in the BERD and meet the criteria for listing in the NRHP, the CRHR, or have local designation. Among these are buildings that comprise the Berkeley Olive Association Historic District, located in the vicinity of Coal Canyon Road and Rocky Lane, that was listed in the National Register in 2000. Notable individually eligible buildings in and around Oroville (listed between 1979 and 2007) include:

- Oroville Chinese Temple (1500 Broderick Street)
- State Theatre (1489 Myers Street)
- Old Oroville Commercial District Building (Montgomery Street)
- Governor Perkins Building (1864 Montgomery Street)
- The Fong Lee Company (address restricted)
- Oroville Carnegie Library (1675 Montgomery Street)
- Oroville Inn (2066 Bird Street)
- Main US Post Office (1735 Robinson Street)
- Biggs Ranch and associated structures and buildings (1359 Oroville Highway)
- Gem Saloon Building (1337 Huntoon Street)

- Bloomer Hill Fire Lookout Station
- Washington Block Building (1975 Montgomery Street)
- Table Mountain Boulevard Bridge

b) Chico Area

Chico includes some of the most important cultural resources in the entire county. Surveys have identified 579 buildings and structures in the Chico area; of these, 123 have been evaluated and have been listed or found to meet the criteria for listing in the NRHP, the CRHR, or have local designation. . Among these are buildings that make up the South of Campus Neighborhood Historic District. Located in the vicinity of Cherry Street and 2nd through 6th Streets, this historic district was listed in the National Register in 1991. Notable individually eligible buildings in and around Chico include the Southern Pacific Depot (5th Street); the Chester Cole Residence (334 Normal Avenue); the Bidwell Mansion (Sowillenno Avenue); the Patrick Rancheria (SR99); the Patrick Ranch House; the A. H. Chapman House (256 E. 12th Street); the Silberstein Park Building (426 – 434 Broadway); St. John's Episcopal Church (230 Salem Street); and the Stansbury House (307 W. 5th Street).

c) Paradise Area

The HRI and BERD together list 33 buildings and structures in and around Paradise that have been surveyed. Four of these have been evaluated and found to meet the criteria for listing in the NRHP, the CRHR, or have local designation. Among these, the Centerville Schoolhouse was nominated and listed in the National Register in 1972. The Honey Run Covered Bridge, listed in 1988, was destroyed by the 2018 Camp Fire, though local efforts are underway to rebuild the bridge.

d) Gridley Area

The town of Gridley includes 68 built environment properties that have been surveyed; of these, two have been evaluated and found to meet the criteria for listing in the NRHP, the CRHR, or have local designation. The Hazel Hotel (850 Hazel Street) was listed in the National Register in 2001.

e) Biggs Area

Twenty-three buildings and structures in the vicinity of Biggs have been surveyed. One of these, the Biggs Rice Experiment Station, has been evaluated and found to meet the criteria for listing in the NRHP, the CRHR, or have local designation. None have been formally nominated and listed in the National Register.

f) Other Areas

In areas located in Butte County other than those listed above, 237 buildings and structures have been surveyed and recorded; of these, 12 have been evaluated and found to meet the criteria for listing in the NRHP, the CRHR, or have local designation. Among these built environment resources, the following have been formally nominated and listed in the NRHP: the W.W. Durham House in Durham, the Magalia Dam and the Magalia Community Church in Magalia, Big Bear Mountain Lookout and Brush Creek Standard Office in Plumas National Forest, Bridge #12-38 on SR70 in Pulga, the Inskip Hotel near Stirling City, and the Hyatt Power House Switching Yard near the Oroville Dam.

ii. California State Historical Landmarks

The State of California officially began commemorating sites important to the history of the state in 1932. Originally, the California Historical Landmarks emphasized well-known places and events including the missions, early settlements, and the Gold Rush. Over the years, the program has been refined to include only those sites that are of statewide historical importance and must be the first, last, only, or most significant of a type in a large geographical area.

The following lists the 10 resources in Butte County that the state has designated as California Historical Landmarks:

- Hooker Oak (Landmark No. 313), Bidwell Park, Chico
- Old Suspension Bridge (Landmark No. 314), Lake Oroville State Recreation Area, Oroville
- Rancho Chico and Bidwell Adobe (Landmark No. 329), Bidwell Mansion State Historic Park, Chico
- Bidwell's Bar (Landmark No. 330), Lake Oroville State Recreation Area, Oroville
- Chinese Temple (Landmark No. 770), town of Magalia
- Dogtown Nugget Discovery Site (Landmark No. 771), Town of Magalia
- Oregon City (Landmark No. 807), Diggins Drive between cities of Oroville and Cherokee

- Discovery Site of the Last Yahi Indian (Landmark No. 809), City of Oroville
- Chico Forestry Station and Nursery (Landmark No. 840-2), Bidwell Park, Chico
- Mother Orange Tree of Butte County (Landmark No. 1043), near the toll bridge at Bidwell's Bar, Lake Oroville State Recreation Area, Oroville

iii. California Points of Historical Interest

California Points of Historical Interest are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. No historical resource may be designated as both a Landmark and a Point of Historical Interest. If a Point of Historical Interest is subsequently granted status as a Landmark, the Point designation will be retired. To be eligible for designation as a Point of Historical Interest, a resource must meet at least one of the following criteria: the first, last, only, or most significant of its type in the State or within the local geographic region (city or county); association with an individual or group having a profound influence on the history of the local area; a prototype of, or an outstanding example of, a period, style, architectural movement or construction; or is one of the more notable works or the best surviving work in the local region of a pioneer architect, designer or master builder.

There are 20 California Points of Historical Interest in Butte County. They are:

- Lott Museum, Oroville
- Manzanita School, east of Gridley
- Chico flour Mill, Chico (Bidwell's Mill Site, Bidwell Mill Stones)
- Garrott's Sawmill, Oroville
- California-Oregon Railroad Depot, Gridley
- Centerville Schoolhouse, northeast of Chico
- Old Chinese Cemetery, vicinity of Oroville
- Townsite of Cherokee and Spring Valley Mine, near Oroville
- Little Chapman Mansion, Chico
- Butte County Railroad Depot, Paradise

- Long's Bar, near Oroville
- Oroville Cemetery, vicinity of Oroville
- Chinese Cemetery, vicinity of Oroville,
- Jewish Cemetery, vicinity of Oroville
- Site of 14-Mile House, Toll Station and Wayside Inn, Vicinity of Chico
- Richardson Springs Resort, northeast of Chico
- Odd Fellows Home (Bella Vista Hotel) Site, vicinity of Thermalito
- The Fagan House, east of Gridley
- Bethel African Methodist Episcopal Church, Chico
- Gianella Bridge, vicinity of Chico

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10 Scenic Resources

A. Introduction

Butte County possesses numerous scenic resources, many of which are found in the natural areas within the unincorporated county. These resources enhance the quality of life for Butte County residents and are a significant attraction that brings tourists to the region. This chapter reviews and summarizes Butte County's key scenic resources, which are mapped on Figure 10-1.

B. Regulatory Setting

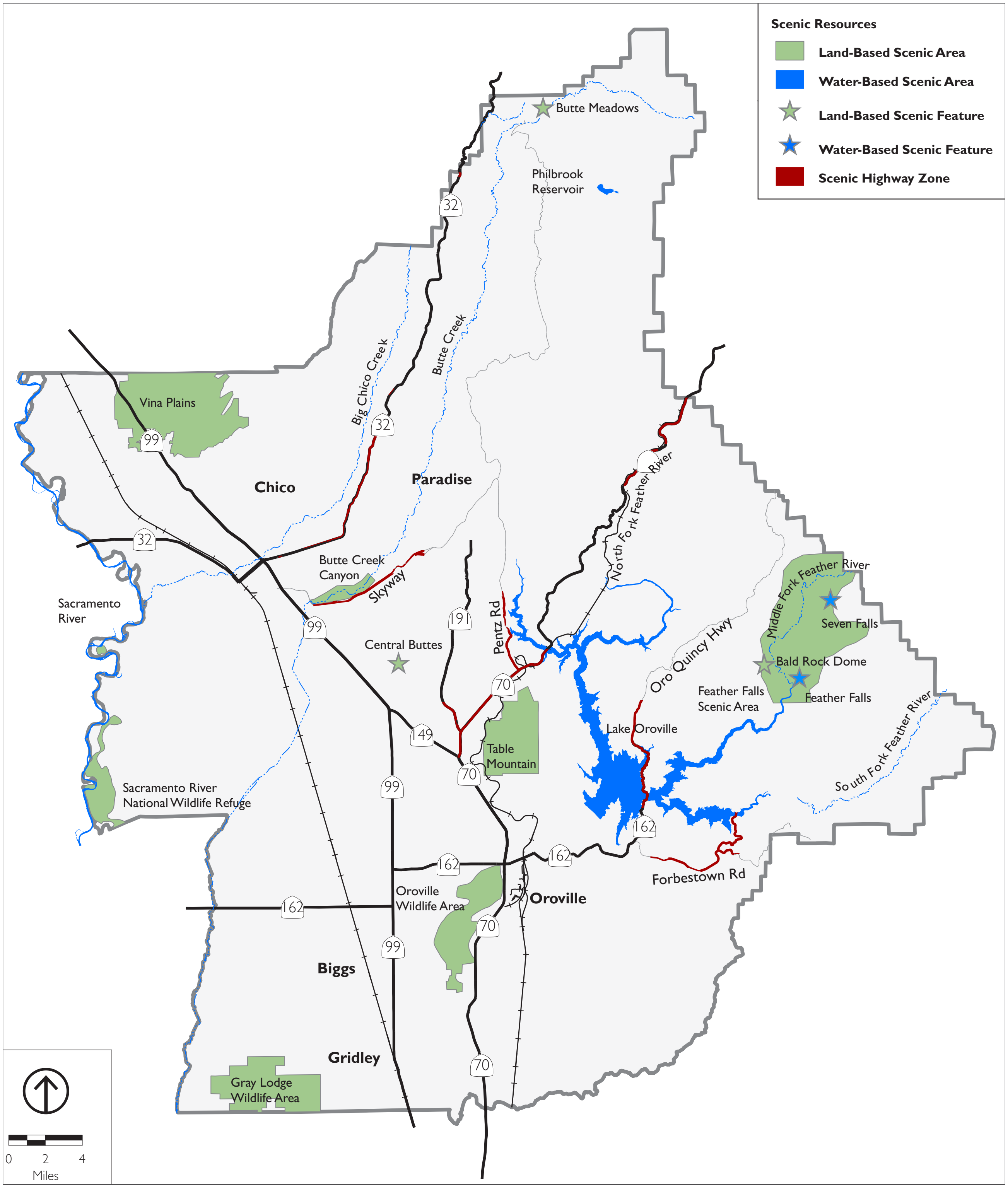
1. State Law Requirements

State law previously mandated the inclusion of a scenic highways element in a general plan, but it has since become optional. However, the California Environmental Quality Act (CEQA) requires analysis of impacts on scenic highways and State law requires the general plan to address scenic open space resources. Butte County's current General Plan includes policies and actions aimed at protecting and enhancing scenic areas adjacent to and visible from highways.

2. California State Scenic Highways Program

California's Scenic Highway Program was created by the State legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors through special conservation treatment. The State laws governing the Scenic Highways Program are found in the Streets and Highways Code, Sections 260 through 263.

When a city or county nominates an eligible scenic highway for official designation, it must identify and define the scenic corridor of the highway. Scenic corridors consist of land that is visible from the highway right of way and is comprised primarily of scenic and natural features. Topography, vegetation, viewing distance, and/or jurisdictional lines determine the corridor boundaries. The city or county must also adopt ordinances, zoning, and/or planning policies to preserve the scenic quality of the corridor or document such regulations that already exist in various portions of local codes. These ordinances and/or policies make up the Corridor Protection Program. The status of a proposed State scenic highway changes from "eligible" to "officially designated" when the local governing body applies to the California Department of Transportation (Caltrans) for scenic highway approval, adopts a Corridor Protection Program, and receives notification that the highway has been officially designated a Scenic Highway. State Scenic Highways in Butte County are discussed in Section C.



Source: PlaceWorks, Butte County General Plan 2030 Setting & Trends Report, 2007.
Butte County Geographic Information Systems; US Forest Service.

Figure 10-1
Scenic Resources

C. Existing Conditions

1. Scenic Highways and Corridors

This section describes various scenic highways and corridors, which are considered so either by virtue of their official designation by the State, through their identification as a County Scenic Highway in the General Plan 2030 Conservation and Open Space Element, or through application of the Scenic Highway (-SH) Overlay Zone.

Some of the scenic highways and corridors in Butte County traverse State-owned lands, where development poses little threat to the viewshed. Others pass through areas that are privately held, such as portions of the following: Forbestown Road east of Lake Oroville above 2,000-foot elevation; Highway 162 on the south side of Lake Oroville and north of the North Fork of the Feather River; Highway 70 north of Oroville and west/north of Table Mountain; and Highway 149 south of the Central Buttes and west of Table Mountain.

a. State Scenic Highways

Although there are no officially designated State Scenic Highways in Butte County, Highway 149 near Highway 70 and Wicks Corner is considered an eligible State Scenic Highway.

b. County Scenic Highways and Corridors

The General Plan 2030 Conservation and Open Space Element recognizes Highway 70 north of the Highway 149 intersection and a portion of Highway 32 south of Forest Ranch as county scenic highways.

c. Scenic Highway (-SH) Zoning

The Butte County Zoning Ordinance uses the Scenic Highway Overlay Zone (-SH) to establish standards to preserve the natural aesthetic qualities of areas visible from roadways designated as scenic highways by the State of California or the Butte County Board of Supervisors. Roads subject to the -SH overlay zone are illustrated on Figure 10-1. As shown on the figure, these include portions of Highway 32 north of Chico; Highway 70 north of the Highway 149 intersection; the Skyway with its expansive views of the Northern Sacramento Valley and Coast Range; the southern portions of Highway 191 and Pentz Road; the portion of Highway 162 along Lake Oroville; Forbestown Road; and Lumpkin Road.

The -SH Overlay Zone allows the same permitted and conditionally permitted uses as the base zone, subject to the requirements of the Overlay Zone, including development standards and findings for approval. Development within the -SH Overlay Zone is intended to feature high quality architectural design, preserve views from the highway, and maintain existing topographic features on the site. When approving a development within the -SH Overlay Zone, the review authority considers the architectural design of the proposed structures and how the project will maintain existing views of scenic resources as viewed from the public right-of-way. The review authority also considers how the site will be graded to preserve natural features on the site and whether the landscaping associated with the project complements the scenic qualities of the site and surrounding areas.

2. Natural Scenic Resources

Butte County encompasses an outstanding variety of natural vistas and landscapes. The following section describes the significant scenic resources found in the county, as appeared in the existing Butte County General Plan. These various resources are mapped in Figure 10-1 and include the following:

- **Table Mountain Spring Floral Area.** The lava flow that now tops Table Mountain brings an explosion of color each year in the form of native wildflowers. Over 3,300 acres of North Table Mountain is protected as an ecological reserve by the State Department of Fish and Wildlife.
- **Central Buttes**. Rising from the valley floor, these geologic features are remnants of the surrounding landform that eroded around them over the millennia. Many of these buttes are visible from State Routes 99, 149 and 70.
- **Sacramento River and its Riparian Corridor.** Some of the county's richest habitat and most beautiful views are found along the Sacramento River and its associated riparian corridor. State and federal agencies have acquired significant portions of the riparian corridor to help protect this resource.
- **Butte Creek Canyon.** The Skyway provides views to a dramatic and panoramic display of the topographic and geologic features of Butte Creek Canyon. A portion of this canyon is protected as an ecological reserve by the State Department of Fish and Wildlife.
- **Lake Oroville.** Lake Oroville provides many scenic vistas from several highways that traverse its shores, while providing an assortment of recreational activities for residents and visitors.

- **Philbrook Lake.** Pacific Gas and Electric Company owns the Philbrook Reservoir, a tranquil mountain lake nestled between several scenic mountain outcroppings.

- **Feather Fall**s **Scenic Area Features**. The Feather Falls Scenic Area, part of the Plumas National Forest, includes granite domes, such as Bald Rock, and waterfalls, such as Feather Falls and Seven Falls.

- **Seasonal Scenic Resources.** Many tourists visit the orchards in the valley areas of Butte County during the early spring when almonds and other trees are blossoming.

3. Scenic Water Resources

Butte County has an abundance of water resources that contribute to the county's visual character. These include both linear waterways and surface water bodies. While some of these resources are included among those described in Section C.2, above, this section provides additional information on those and other important scenic water resources in the county.

a. Rivers, Streams, and Creeks

Butte County is part of the Sacramento River watershed and is bounded by the Sacramento River on its west side. Numerous streams and rivers drain runoff from the Sierra Nevada and Cascade Mountains southwesterly across the county into the Sacramento River. Of these waterways, the most significant are Butte Creek, Big Chico Creek and the North, Middle and South Forks of the Feather River. These rivers pass through rugged terrain, which often obstructs visual access to the water. Nevertheless, they are significant visual features within the county. A 77.6-mile portion of the Middle Fork of the Feather River has federal Wild and Scenic River status.[1]

b. Surface Water Bodies

Also significant as visual features are Butte County's lakes and reservoirs. Few natural lakes exist in the county, although numerous reservoirs have been built to provide domestic and irrigation water, hydroelectric power, recreation, flood control and watershed management. The most visually significant of the county's water bodies are Lake Oroville, which covers over 15,500 surface acres and has 167 miles of shoreline, along with Thermalito Forebay and Afterbay. Other important reservoirs in the county include Concow Reservoir, Paradise Lake, Magalia

[1] National Wild and Scenic Rivers System. Feather River (Middle Fork), California. Accessed February 20, 2021. https://www.rivers.gov/rivers/feather.php

Reservoir, Philbrook Lake, Lake Madrone, Ponderosa Reservoir, and Lake Wyandotte. Figure 12-1, in Chapter 12, Water Resources, maps the locations of these water bodies.

11 Mineral Resources

A. Introduction

The topography of Butte County varies dramatically from the gentle flatlands of the Sacramento River Valley in the western part of the county to the rugged foothills of the Sierra Nevada in the eastern portion of the county. This diversity on the surface of the land expresses the complexity of the geology underneath it. That complexity determines the location of mineral resources. It also determines other factors, such as how various geologic hazards may threaten life and property, groundwater supplies, climate, flooding hazards, and others that are described in other chapters of this document.

B. General Geologic Setting of Butte County

The western portion of Butte County is part of the Great Valley geomorphic province. The Great Valley province is the geologic term for the Central Valley of California, which is drained by the Sacramento River in the North and the San Joaquin River in the south. The Central Valley extends nearly 500 miles north and south, and averages about 40 miles in width between the Coast Ranges on the west and the Sierra Nevada and Cascades on the east. Geologically, the Great Valley province is characterized by great thicknesses of generally flat-lying sedimentary rocks overlain by soils that were deposited by floods or runoff. These deposits are called "alluvium." In Butte County the soils range in thickness from a few inches near the foothills to more than 200 feet near the Sacramento River. Also, the sedimentary rocks of the Great Valley province are relatively flat and dip gently west to southwest with only minor faults and folds that run parallel to the structural trend of the valley and the Sierra Nevada.

Much of the eastern portion of Butte County is part of the Sierra Nevada geomorphic province. The Sierra foothills in Butte County are rather complex geologically, and contain a wide variety of igneous, metamorphic, and sedimentary rocks. The metamorphic base rocks of the Sierra Nevada have been subjected to intense folding and faulting which has produced an area of steeply eastwardly dipping, northwesterly striking bedrock series through the center of the Sierra. These bedrock series are bounded on both the west and east sides by zones of active or potentially active faults. In eastern Butte County, granites have been pushed into these metamorphic rocks in a process called "intrusion." The contacts between the intruded granites and the older metamorphic rocks are usually marked by faults.

The northernmost part of Butte County, near Jonesville, is part of the Cascade Range geomorphic province. This geomorphic province is characterized by major volcanoes, including Mount Lassen. Lava flows and other volcanic deposits compose most of the surface materials in this province.

Each of these areas has a distinct geologic history. The eastern half of Butte County lies in that part of the Sierra Nevada that is comprised of strongly deformed and metamorphosed rocks of Paleozoic age intruded by a granitic batholith of Mesozoic age. Large clumps of granite rock that lay under the earth until they were exposed by erosion, called plutons, probably of Cretaceous or earlier age, intrude the metamorphic rock with mineralization that often shows along the veins and seams of gold-bearing quartz that intruded the fissures and joints of the granitic rock.

From the beginning of the Cretaceous period, the upthrust rocks of the eastern half of Butte County were eroded, and the resulting rock and silt flowed down into the Sacramento Valley. In the western half of the county the rocks of the Central Valley are primarily flat-lying Cretaceous, Eocene, and younger formations, consisting of shale, sandstone, conglomerate, and volcanic rock that overlap the older metamorphic series. Older alluvial deposits occur as nearly flat plain deposits in the western portion of the county on the floor of the Sacramento Valley. The older alluvium consists of moderately consolidated clay, silt, and sand. Alluvium covers much of the valley floor and also occurs along many of the ancient, inactive streambeds and as the present stream channels that drain into the valley from the mountains to the east. These deposits are loose, unconsolidated, and consist of a mixture of boulders, gravel, sand, and lesser amounts of silt, and can range from 10 to 50 feet in thickness. Intermixed with the rock debris are often remnants of gold that was deposited in the mountains to the east and eroded away as the mountains thrust upward.

C. Mineral Resources

The following section provides an overview of mineral and soil resources in Butte County that are managed by County government.

1. Regional Overview

The majority of the area's sand and gravel deposits occur in two regions, along the Sacramento River and within a band running from north to south down the center of the county. Gravel in the Sacramento River is no longer extensively mined, due to environmental constraints and the difficulty of working in an area with a high water table. The county's central "gravel belt" comprises the transitional region where sediments washed down from the Sierra Nevadas into the slower moving rivers of the flat valley. This is the region in Butte County where gravel mining is most active. In the past, these residual gravel deposits were mined for their gold content. However, today they are mined for gravel and sand, to be used in combination with portland cement or asphalt compounds in construction and road building. Sand and gravel deposits are also mined for silica, used in the production of cleansers, abrasives, and toothpaste.

In California sand and gravel has an economic value many times larger than that of all other minerals mined statewide, including gold. However, gold mining has played a larger role in the history of the State, and it remains an important part of mining in Butte County. The gold found in Butte County is often mined with sand and gravel operations. However, there are many historic gold mines located in the eastern part of the county that are no longer operating, and many more that have yet to be discovered or are not economically feasible to operate.

2. Mineral Resources: Historical Perspective

From a historical perspective, gold and gravel have played an important role in the development of Butte County. Although it is the gold that originally attracted people to the Sierra foothill region of Butte County, the economic value and widespread use of sand and gravel today is more important and of greater value than gold mining. Gold can be traced back to the old Tertiary riverbeds and the quartz veins formed in the Sierra Nevada Mountains, the primary source of all gold in the region. Therefore, where original gravel deposits exist, there is a high probability of finding placer gold.

Mining activities carried out during California's Gold Rush days were conducted with little or no regard for the environment. Mountains and streams were altered by hydraulic mining and manual labor. Some of the most productive Tertiary channel deposits of gold in the State have been found in Butte County, including the Magalia, Cherokee, and Bangor-Wyandotte districts. The largest true nugget of native gold in California was the Willard, Dogtown, or Magalia nugget found in Magalia in 1859, weighing 54 pounds. Famous gold mining regions of Butte County include Bangor, Bidwell Bar, Butte Creek, Cherokee, Clipper Mills, Concow, Forbestown, Honcut, Inskip, Kimshew, Magalia, Morris Ravine, Oroville, Wyandotte, and Yankee Hill. These communities originally sprang up around gold mining. Many of these historic gold regions are now mining the residual sand and gravel resources, with the extraction of gold as a secondary operation.

3. Mining in Butte County

Mining activities in Butte County focus on two industries: sand and gravel, and gold. Table 11-1 contains a list of mines in the county and Figure 11-1 maps the sites. Although other mineral resources have been or are extracted in Butte County, sand and gravel plays the greatest role in the county's economy.

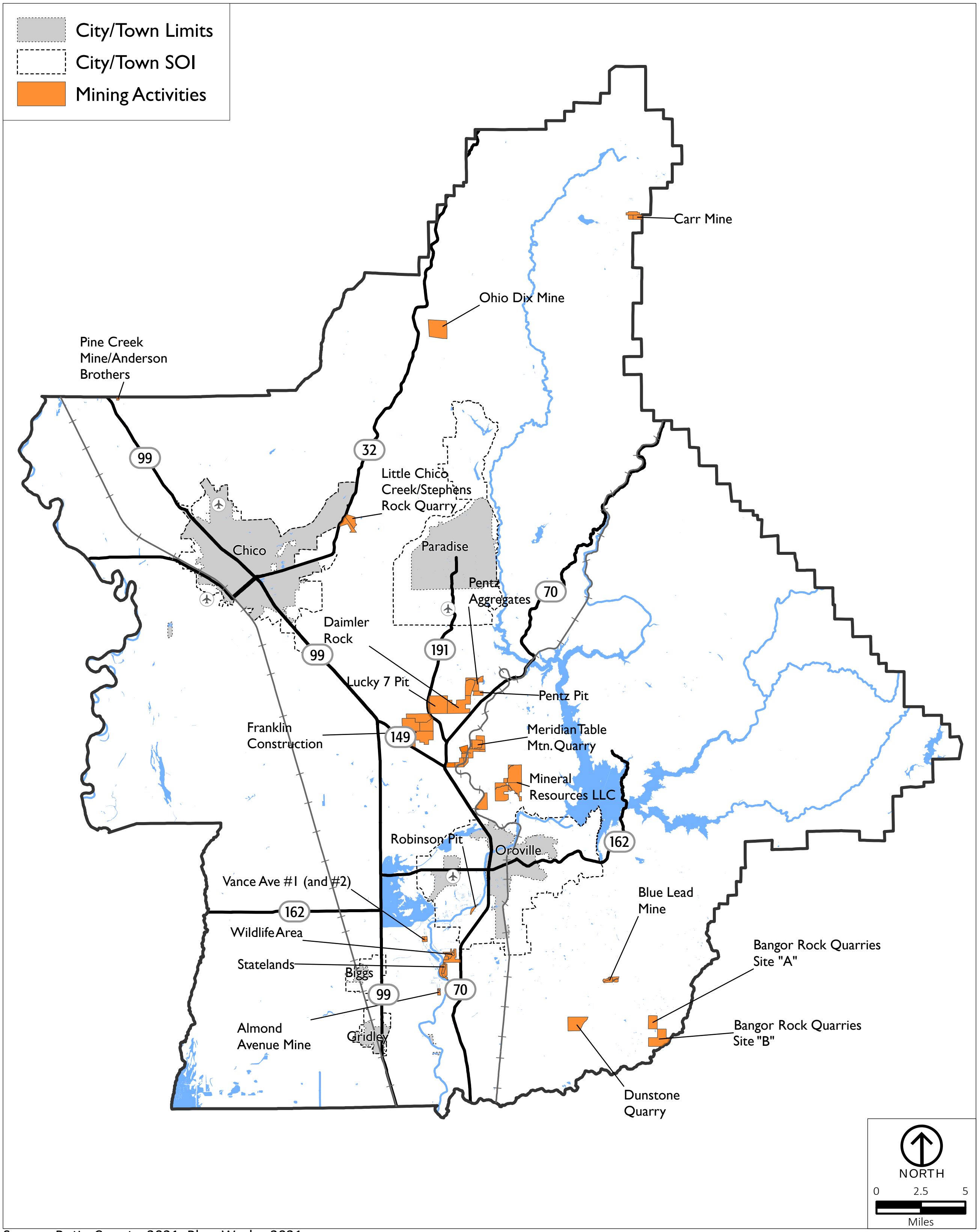
Aggregate resources, such as sand and gravel, are used extensively in all types of construction: residential, commercial and industrial, roads and highways, dams, and bridges. In 2010, the California Geological Survey completed a study for the Power House Aggregate Project, which evaluated the aggregate potential of a 460-acre project site located about 7 miles south west of the City of Oroville and 5 miles northeast from the City of Gridley. The study found aggregate resources present at the project site exceeded the minimum threshold value of $17.1 million dollars for 2009 as established by the State Mines and Geology Board.[1] The California Geological Survey has not conducted a study to determine the total amount of demand for aggregate resources in the entire county. However, a general rule is that the demand for aggregate resources will essentially parallel a region's growth rate. There are no specific studies of per-capita consumption of aggregate resources in Butte County. California Geological Survey studies in the Central Valley in the 1990s show that the rate of consumption varies between 5 and 10 tons per person, averaging about 7.5 tons per person.

[1] California Geological Survey Department of Conservation, 2010, *Mineral Land Classification of the Power House Aggregate Project Site – For Construction Aggregate*, page 5.

TABLE 11-1 PERMITTED MINES IN BUTTE COUNTY

Mine Name	Permit No.	State ID No.	Commodity
Power House Mine	MIN09-0001	91-04-0034	Sand, Gravel
Wildlife Area	UP 91-04	91-04-0004	Sand, Gravel
Robinson Pit	RP 78-96	91-04-0005	Sand, Gravel
Statelands Mine	MRP 86-38	91-04-0008	Sand, Gravel
Vance Avenue 2 Mine	MIN18-0003	91-04-0021	Sand, Gravel
Vance Avenue 1 Mine	UP 77-96	91-04-0007	Sand, Gravel
Almond Avenue Mine	Vested	91-04-0018	Sand, Gravel
Morris Ravine Quarry	UP 93-36, MIN15-0001	91-04-0015	Sand, Rock
Table Mountain Quarry	MIN 04-01	91-04-0011	Rock, Crushed Rock
Daimler Rock	MIN 98-02	91-04-0028	Gravel
Pentz Pit	Vested	91-04-0001	Sand, Gravel
Lucky 7 Pit	MRP 94-63	91-04-0014	Sand, Gravel
Bangor Rock Quarries Site B	UP 88-35 (A)	91-04-0002	Rock, Crushed Rock
Bangor Rock Quarries Site A	UP 88-35 (A)	91-04-0006	Rock, Crushed Rock
Dunstone Quarry	MRP 84-33	91-04-0019	Sand, Gravel
Blue Lead Mine	MRP 81-43	91-04-0020	Gold
New Carr Mine	MIN11-0001	91-04-0038	Gold
Little Chico Creek Mine	MIN18-0002	91-04-0030	Rock, Crushed Rock

Source: Butte County Department of Development Services. Data updated April, 2021.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE 11-1

MINING ACTIVITIES

Butte County had an estimated population of 220,000 in 2010, which grew to 226,374 in early 2018, representing a growth of 2.8 percent over the eight-year period.[2] However, following the 2018 Camp Fire, which destroyed 13,972 homes, the population was reduced to 210,291 in 2020.[3,4] Despite the recent impacts to the region's population from both the Camp Fire and 2020 North Complex Fire, the region anticipates growth in the coming years, which would support continued high demand for aggregate resources in Butte County, including resources that will directly contribute to the fire rebuild. The mining of aggregate and rock resources provides a regionally significant source of construction materials within close proximity to a local need. Because sand, rock, and gravel are expensive to transport, construction and development are aided when substantial quantities of these materials exist close by.

The primary economic benefit to the County from aggregate resources comes from property and sales taxes. Property taxes are set by State law, including Proposition 13, which generally limits property taxes to approximately 1 percent of a parcel's appraised value at the time of sale and limits annual increases to no more than 2 percent, except when property changes ownership or undergoes new construction. If the parcel contains mineral resources, the County imposes minimal additional property taxes. A sales tax is usually levied at the general sales tax rate based on 7.25 percent of the total sales dollars.[5] It should be noted that a sales tax is incurred only when a sale is made to the public, not when a raw material is sold to a producer.

Butte County also benefits from jobs in mining. Although the commercial extraction of sand and gravel, hard rock, and gold are not labor intensive, it contributes to the county's economic output. However, the number of jobs associated with mining is minimal. Based on California Employment Development Department projections from 2016 to 2026, the number of people employed in

[2] California Department of Finance. 2020. Table E-5 2020 Population and Housing Estimates.

[3] Butte County District Attorney. June 16, 2020. The Camp Fire Public Report: A Summary of the Camp Fire Investigation. https://www.buttecounty.net/Portals/30/CFReport/PGE-THE-CAMP-FIRE-PUBLIC-REPORT.pdf?ver=2020-06-15-190515-977

[4] California Department of Finance. 2020. Table E-5 2020 Population and Housing Estimates.

[5] California Department of Tax and Fee Administration, California City & County Sales & Use Tax Rates, https://www.cdtfa.ca.gov/taxes-and-fees/rates.aspx, accessed February 20, 2021.

construction, mining, and logging in Butte County was projected to rise from 3,600 to 4,300 (statistics on construction, mining, and logging are included together).[6] Based on the most accurate information available, there are 17 permitted mines in Butte County.

4. Mineral Resources: Existing Policies

Mining is often a source of controversy in local land use planning as it has the potential to cross a wide spectrum of environmental issues. These issues range from the compatibility of mining with adjacent land uses, to its direct environmental impacts to air, water, biology, noise, geology, aesthetics, traffic, archaeology, and public safety.

Many laws and regulations govern mineral exploration and extraction to protect against potential adverse environmental consequences. These laws and regulations include local controls imposed on a county-wide level, as well as State and federal regulations.

The most important mineral resource policies are found in the California's Surface Mining and Reclamation Act (SMARA). SMARA establishes a statewide policy for conservation and development of mineral lands in California. It also provides requirements for a permit and reclamation plan approval before conducting a surface mining operation. Under the Act, there is no distinction between exploration and actual mining. Activities below the threshold defined by the Act are exempt from regulation; those exceeding the threshold are regulated. These regulations require the mine operator to obtain mining permits from local county governments prior to initiating work.

The Butte County Department of Development Services carries out SMARA, regulating mining activity through issuing a Conditional Use Permit, which may set out specific time limits and conditions for both exploration and mining activities. The State directs counties to apply SMARA policies to surface mining operations. These directives include policies on the conduct of surface mining operations as well as specific measures to be employed in reclamation of the mine, including grading, backfilling, resoiling, revegetation, soil compaction, soil erosion control, water quality and watershed control, waste disposal, and flood control. State policies do not include aspects of regulating surface mining operations that are solely of local concern, and not of statewide or regional concern, such as hours of

[6] State of California Employment Development Department. 2020. 2016-2026 Employment Projections.

operation, noise, dust, fencing, and aesthetics. These factors are normally administered and regulated by the local lead agency. SMARA requires that every lead agency establish, in accordance with State policy, mineral resources management policies to be incorporated in the General Plan, including:

- Recognition of the mineral classifications and information prepared by the State Geologist;
- Management of land use that affects areas identified as being of statewide and regional significance; and
- Emphasis on conservation and development of identified mineral resources.

SMARA contains specific provisions for the classification of mineral lands by the State Geologist. Land is designated as Mineral Resource Zones (MRZ), including MRZ-1, MRZ-2, MRZ-3, or MRZ-4, as shown in Table 11-2. The most significant designation is MRZ-2, which is a designation of mineral resources that are of regional or statewide significance because these areas contain economic mineral resources. These classified lands and designated areas ultimately must be recognized by the county in its General Plan to adopt appropriate and compatible land use designations, and to establish policies and implementation programs for the conservation and development of these resources. The County's land use decisions involving areas designated as being of regional or statewide significance must be in accordance with mineral resource management policies. It must also, in balancing mineral values against alternative land uses, consider the importance of these minerals to their market region as a whole, and not just their importance to the county's area of jurisdiction.

SMARA also requires that a Reclamation Plan be prepared and approved by the County before the initiation of mining operations. The purpose of the Reclamation Plan is to ensure that mined lands are reclaimed to a condition that is readily adaptable for alternative land uses. Major goals in requiring such a plan are to optimize subsequent land use at a reasonable cost and to avoid the legal and environmental problems created by abandoned mines. The Reclamation Plan must identify "how the mine will be reclaimed into a useful land use after mining is completed in a given phase, area, or on the entire project site."[7] Depleted sand and gravel pits in California have been used in many ways. These uses include solid

[7] Butte County Department of Development Services, *Butte County Mining Permit & Reclamation Plan Application Packet*, page 3.

waste disposal, open space for parks, land and water recreation, spreading basins for groundwater recharge through percolation, and urban development.

The State Geologist has not prepared a mineral land classification map or report for all the aggregate resources in Butte County. Although aggregate resources are recognized as being regionally significant minerals, a specific map designating where these resources occur and the associated MRZ-2 zoning designation has not been prepared. In addition, a Mineral Resource Management Plan has not yet been adopted. To remedy this situation, public or private entities can petition the State Geology Board to classify specific lands that contain significant mineral deposits and that are threatened by land use incompatibilities. Alternatively, Butte County could formally request that the State Board of Geology map the entire county.

SMARA requires all cities and counties to incorporate in their general plans mapped designations approved by the State Mining and Geology Board (SMGB). The local general plan must recognize these categories and establish policies and programs for the conservation and development of these resources. According to the Department of Conservation, there are three publications of the SMARA mineral land classification reports in Butte County, described below.

In 1994, the County received a Petition for Mineral Classification from the SMGB for the Greenrock Quarry near Oroville (now known as Martin Marietta Materials, Table Mountain Quarry). This Petition involves approximately 320 acres of land and is considered an active mine (California Mine ID 91-04-0011). The SMGB concluded that part of this mine is classified as MRZ-2a for railroad ballast. The remainder of the property has been classified as either MRZ-2b or MRZ-1 for railroad ballast.

In 2001, the California Geological Survey gave an MRZ-2a designation to a portion of the Ord Ferry Quadrangle, also known as the M&T Chico Ranch site. The Survey concluded that the aggregate resources on this property exceeded a threshold value of $13.1 million dollars. Therefore, the property could receive the MRZ-2a designation. Though the precise market value and volume of aggregate was proprietary information, the Survey's report called the resources "significant high quality construction aggregate resources." However, the M&T Chico Ranch mine proposal was not approved by the County.

The third SMARA mineral land classification report in Butte County is for the Power House Aggregate Project, located about 7 miles south west of Oroville and 5 miles north east from Gridley. The project site is approximately 460 acres in size. The California Geological Survey assigned an MRZ-2 designation for the project site and found the aggregate resources exceed the minimum threshold value of $17.1 million as established by SMGB. In 2012, the County approved a Conditional Use Permit, Mining Permit and Reclamation Plan for the Power House Mine. The permitted mine area encompassess 454 acres and is estimated to have 28,400,000 tons of sand and gravel[8]. The Power House mine has not initiated operations at this time and the County permit is set to expire in 2022, unless it is extended.[9]

[8] Butte County Department of Development Services. March 2021.

[9] Rowland Hickel. Senior Planner, Department of Development Services, Butte County. Personal communication with Angelica Garcia, PlaceWorks. February 16, 2021.

TABLE 11-2 MINERAL RESOURCE ZONING CATEGORIES

MRZ-1	Areas where adequate geologic information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence. This zone is applied where well developed lines of reasoning, based on economic-geologic principles and adequate data, indicate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRZ-2a	Areas underlain by mineral deposits where geologic data show that significant measured or indicated resources are present. MRZ-2 is divided based on both degree of knowledge and economic factors. Areas classified MRZ-2a contain discovered mineral deposits that are either measured or indicated reserves as determined by such evidence as drilling records, sample analysis, surface exposure, and mine information. Land included in the MRZ2a category is of prime importance because it contains known economic mineral deposits. A typical MRZ-2a area would include an operating mine, or an area where extensive sampling indicates the presence of a significant mineral deposit.
MRZ-2b	Areas underlain by mineral deposits where geologic information indicates that significant inferred resources are present. Areas classified MRZ-2b contain discovered deposits that are either inferred reserves or deposits that are presently sub-economic as determined by limited sample analysis, exposure, and past mining history. Further exploration work and/or changes in technology or economics could result in upgrading areas classified MRZ-2b to MRZ-2a. A typical MRZ-2b area would include sites where there are good geologic reasons to believe that an extension of an operating mine exists or where there is an exposure of mineralization of economic importance.
MRZ-3a	Areas containing known mineral deposits that may qualify as mineral resources. Further exploration work within these areas could result in the reclassification of specific localities into the MRZ-2a or MRZ-2b categories. MRZ3a areas are considered to have a moderate potential for the discovery of economic mineral deposits. MRZ-3 is divided based on knowledge of economic characteristics of the resources. An example of an MRZ-3a area would be where there is direct evidence of a surface exposure of a geologic unit, such as a limestone body, known to be or to contain a mineral resource elsewhere, but has not been sampled or tested at the current location.
MRZ-3b	Areas containing inferred mineral deposits that may qualify as mineral resources. Land classified MRZ3b represents areas in geologic settings which appear to be favorable environments for the occurrence of specific mineral deposits. Further exploration work could result in the reclassification of all or part of these areas into the MRZ-3a category or specific localities into the MRZ-2a or MRZ-2b categories. MRZ-3b is applied to land where geologic evidence leads to the conclusion that it is plausible that economic mineral deposits are present. An example of an MRZ-3b area would be where there is indirect evidence such as a geophysical or geochemical anomaly along a permissible structure which indicates the possible presence of a mineral deposit or that an ore-forming process was operative.
MRZ-4	Areas where geologic information does not rule out either the presence or absence of mineral resources. The distinction between the MRZ-1 and MRZ-4 categories is important for land use considerations. An MRZ-4 classification does not imply that there is little likelihood for the presence of mineral resources, but rather that there is a lack of knowledge regarding mineral occurrence. Further exploration work could well result in the reclassification of land in MRZ-4 areas to MRZ-3 or MRZ-2 categories.

Source: Department of Conservation State Mining and Geology Board, Guidelines for Classification and Designation of Mineral Lands.

5. Mineral Resources: Permitted Mining Activities

The status of mining activities in Butte County can be identified through the information in Table 11-1, which shows a strong pattern of sand, gravel, and rock as the predominant mining commodities. Table 11-1 describes the mine's name, State identification number, and primary commodity of 17 permitted mines.

6. Mineral Resources: Potential

a. Rock Resources

There are three categories of potential rock resources in Butte County. These categories include In-Channel Resources, consisting of the Quaternary gravel present in surficial quantities in stream channels; Off-Channel Resources or Terraces, involving the removal of sands and gravels that have been overlaid by soils located adjacent to or within an active or ancient floodplain; and Hardrock Operations, consisting of the removal of consolidated rock materials located in foothill and mountainous regions.

Aggregates extracted from both in-channel and off-channel sources are used extensively in all types of construction. Raw materials are processed (washed, screened, crushed, graded, classified, etc.) and sold as road base or sub-base in loose form and in a binding mixture with cement or asphalt. One of the main difficulties with aggregate resources is transporting of materials to a processing facility and the transporting of the final product to its prospective market. Due to the sheer mass and weight of aggregate, transportation is expensive, and centralized processing plants are not desirable. Gravel is generally mined in proximity to its potential market. For this reason, aggregate from Butte County continues to be used primarily within the county.

Hardrock operations occur primarily in areas of high topographic relief. Mining operations consist of the removal of soils and weathered overburden, followed by the extraction and processing of the hard unweathered bedrock. The rock is then crushed and sorted. The processed quarry rock is used primarily for various road materials or mixed with asphalt. Other uses include fill, drain rock, riprap, and decorative materials. The predominant use of hard rock in Butte County is for base (such as for roadways or structures), ballast (rock used for the base material of a railroad track), or rip-rap used for rock wall armoring. Bangor Rock Quarry, Little Chico Creek Mine, Morris Ravine Mine, and the Table Mountain Quarry are the only hardrock mining facilities operating in Butte County.

b. Gold Resources

Gold mining in Butte County historically has taken a variety of forms, ranging from simple one-person operations of gold panning and suction dredging to large scale commercial extraction and processing operations. The main form of gold mining in Butte County has been placer mining, involving so-called placer deposits. A placer deposit is a mass of gravel, sand, or other similar material resulting from erosion of solid rock and containing particles of gold. Placer mining involves removing the surface gold bearing gravels, and either washing or chemically extracting the gold ore from the gravel. As of 2007, there were no permitted placer mines in Butte County, although the California Department of Fish and Wildlife regulates suction dredge mining within the County's creeks and rivers.

Buried placer deposits are located throughout the county and are not easily identified. Two of the county's best known buried placer deposits include one under the Town of Paradise and one under Table Mountain. Table Mountain contains a placer deposit buried under an ancient lava flow which forms the flat top of the mountain. The area of Cherokee on the northwest side of Table Mountain is the historic site of an old gold mining camp which used hydraulic blasting to wash away the mountain's walls to get to the gold-laden gravels. With mining restrictions and a heightened environmental sensitivity, hydraulic blasting is no longer allowed. Instead, buried placer deposits are obtained through drift mining, which involves digging into the ground and tunneling horizontally to extract the gravels. The economics associated with drift mining are restrictive, as it costs 5 to 10 times more to drift mine than to use an open pit mine. A large quantity of high-quality gold is necessary for drift mining to be economically feasible.

The second kind of gold mining is called lode mining, referring to the Mother Lode, the veins of gold embedded within subsurface rock material. Lode gold often involves open pit mines and the blasting of mountains to expose the deep veins of gold. Examples of lode gold mines in Butte County include the Blue Lead and New Carr mines.

The development and improvement of cyanide heap leaching methods has greatly improved gold production. Use of cyanide to separate precious metals from waste rock is an old technique practiced for a century, but it has only been in the past 30 years that the method has been improved for use on high tonnage, low-grade deposits. As of 2021, there were no mines using heap leach processing in the county.

c. Soil Resources

Soil is not normally defined as a mineral or an aggregate. However, it is an important earth resource. While some topsoil for fill and landscaping is mined in Butte County, soil is not mined on a large scale for this purpose. More important is soil's ability to produce and sustain profitable food and fiber crops. Pound for pound, the crops that soil can produce are far more valuable than the actual commercial value of the soil itself. For example, Butte County's 2019 Crop Report stated that the total value of Butte County's agricultural production was $688,369,916. This makes Butte County's soil an important local resource.

Modern agricultural practices have shifted over the years to include the widespread use of pesticides, fertilizers, herbicides, and other chemical products. These chemicals can accumulate and cause detrimental affects to the quality of soils and groundwater. In addition, irrigation techniques, if not managed properly, can adversely affect the soil by leaching it of important nutrients and organic material. This leaching effect essentially "strips" the soil of its ability to produce crops requiring certain nutrients without the aide of soil additives. Soil leaching also occurs through repeated cultivation of the same crop. Cultivation of a crop requires the extraction of a specific combination of nutrients from the soil, and when this cultivation is repeated year after year, it has a cumulative affect on the properties of the soil.

In 2003, the Butte County Resource Conservation District (RCD) was created after passage of a 2002 countywide ballot measure. These districts, once known as Soil Conservation Districts, are "special districts" of the State of California, set up under California law to be locally governed agencies with their own locally appointed, independent boards of directors. Although RCDs are established locally by the rules of a county's Local Agency Formation Committee (LAFCO), and they often have close ties to county government, most are not county government entities.[10] The core function of RCDs are to conserve resources in their districts and educate landowners and the general public about resource conservation.[11]

[10] Resource Conservation District of Butte County, What We Do, https://www.bcrcd.org/what-we-do accessed on February 15, 2021.

[11] Resource Conservation District of Butte County, What We Do, https://www.bcrcd.org/what-we-do accessed on February 15, 2021.

Soil reclamation activities in Butte County associated with agricultural stabilization and conservation are oriented toward the future development of agricultural lands rather than existing soils problems. Regulation and enforcement of soil-related problems or implementation of reclamation and conservation practices are left primarily up to individual property owners.

Soil problems are handled by the Natural Resources Conservation Service, which provides technical assistance as requested by Butte County. Also, the local Farm Service Agency (FSA) can assist with loans that provide financial assistance for agricultural producers that help reduce soil erosion. These assistance programs are not mandatory, so the responsibility to protect and restore soil resources falls on the individual landowner.

A majority of the agricultural related reclamation work in Butte County involves water, specifically the use of water for rice field irrigation. The County Agricultural Commissioner and the Natural Resources Conservation Service work with farmers to install tail-water return systems, irrigation systems that prevent the water used on a rice field from leaving the site. This system prevents water containing pesticides and herbicides from entering off-site waterways. The tail-water return system also recycles the irrigation water, thereby conserving water resources.

RCD is working on a number of resource conservation projects in the County, including reforesting areas where trees were burned in recent wildfires. RCD held a tree giveaway event in November 2020 as a part of the Camp Fire Restoration Project. RCD also assisted the City of Chico with developing a citywide Vegetative Fuels Management Plan. This Plan includes “several priority projects to reverse the negative ecological effects of long-term fire suppression, restore natural and cultural fire to our parklands, raise sightlines and increase user safety, and reduce ladder fuels that could threaten parkside homes.”[12] RCD also helps landowner apply for grant programs connected with resource conservation, such as the State Water Efficiency and Enhancement Program.

The County’s role in regulating agricultural soil reclamation and conservation primarily involves implementing the 1985 California Farm Bill, commonly known as the Swamp-buster/Sod-buster Act. The Farm Bill has been amended several times and on December 20, 2018, the latest Farm Bill was signed into law. The

[12] Resource Conservation District of Butte County, City of Chico Vegetative Fuels Management Plan EIR, https://www.bcrcd.org/city-of-chico-vegetative-fuels-management-plan-eir, accessed on February 15, 2021.

Farm Bill, "offers financial and technical assistance through conservation practices, activities and enhancements to help agricultural producers make and maintain improvements on their land." To participate in most United States Department of Agriculture programs, the agricultural producers need to comply with wetland conservation provisions that include not farming on converted wetlands. Agricultural producers that wish to apply for the programs offered through the 2018 Farm Bill must submit a 1026 form to the Butte County FSA. This form asks an applicant to answer questions regarding the impacts on wetlands or highly erodible soils from future agricultural activities. The drawback of this program is that it only applies to projects with some form of government intervention (i.e., subsidization or financial support) and does not apply to other agricultural operations which may be involved in similar, possibly more extensive, degradation to the county's wetlands and highly erodible soils.

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12 WATER RESOURCES

Water is one of Butte County's most important natural resources. Annual precipitation in this northern California county is relatively high and rainwater, surface water, and groundwater contribute to Butte County's residential, commercial, agricultural, environmental, habitat, and recreational uses.

According to the California Department of Finance, Butte County's population, as of July 2020, was approximately 206,360 persons, and the Butte County Association of Governments projects the population of the county to increase at an average annual rate of about 0.7 percent. Local, regional, and statewide population growth, continued water demands from other uses such as agriculture and industry, and water to maintain habitat (also called "environmental uses") all reflect competing needs for water supply.

To appropriately assess supply and plan for future needs, water (both surface and groundwater) should be seen as an interconnected system, with activities in any part of the system affecting water supply and water quality in the entire system. The four major sections of this chapter describe the various aspects of this system including the federal, State, and local regulatory environment; physical setting for Butte County's water resources; existing water service providers and the treatment, conveyance, and storage facilities they operate; water quality; and a brief assessment of existing and future availability of water supply, as well as water conservation measures.

I. REGULATORY SETTING

Surface water quality in Butte County is managed by local agencies through a Memorandum of Understanding with the Regional Water Quality Control Board (RWQCB or Regional Board) in accordance with a series of State and federal standards. The County applies State water quality standards for dischargeable allowances, wastewater reclamation, and drinking water quality. State and local agencies share responsibility for implementation of other water-quality regulations, including those related to permitting, water quality monitoring, and citations for violation of applicable laws. Butte County also institutes standards and regulations concerning water resources and plays a key role in monitoring and managing critical groundwater and surface water sources and their use.

A. State and Federal Regulations

A number of federal and State agencies have management and regulatory authority over water resources in Butte County, intended to safeguard those resources for various beneficial purposes such as such as domestic and agricultural use, environmental conservation, and power generation. In many cases, responsibility for implementation and enforcement of regulations enacted at the federal level is delegated to State and local agencies. These various agencies and key regulations are discussed in the following subsections.

Prominent among these regulations are those enacted by the State that mandate local assessment of, and planning for, long-term water supply. These specific plans and programs are discussed in detail in Section C.

1. State and Federal Water Quality Regulations

The California State Water Resources Control Board (SWRCB or State Board) and the nine Regional Water Quality Control Boards (RWQCBs) have the authority in California to protect and enhance water quality. This role is achieved both through their designation as the lead agencies in implementing the Section 319 nonpoint source program of the federal Clean Water Act, and from the state's primary water-pollution control legislation, the Porter-Cologne Water Quality Control Act.

The RWQCB Region 5 office in Redding guides and regulates water quality in streams and aquifers of the northern Sacramento Valley area through designation of beneficial uses, establishment of water-quality objectives, administration of the National Pollutant Discharge Elimination System (NPDES) permit program for storm water and construction site runoff, and Section 401 water-quality certification where development results in fill of jurisdictional wetlands or waters of the United States under Section 404 of the Clean Water Act.

a. Central Valley Region Water Quality Control Plan

The RWQCB Region 5 office regulates water quality in the Central Valley in accordance with the Water Quality Control Plan or "Basin Plan."[1] The Basin Plan presents the beneficial uses that the Regional Board has designated for local aquifers, streams, marshes, and rivers, as well as the water-quality objectives and criteria that

[1] California Regional Water Quality Control Board (RWQCB), 2018. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region (With Approved Amendments): The Sacramento River Basin And The San Joaquin River Basin. Fifth Edition. Revised May 2018.*

must be met to protect these uses. A number of existing beneficial uses have been designated for the lower Sacramento River, and are considered to reasonably apply to its tributaries. These include agricultural supply, contact and non-contact aquatic recreation, cold and warm freshwater habitat, and wildlife habitat.

b. Clean Water Act-National Pollutant Discharge Elimination System

The 1987 amendments to the Federal Clean Water Act [Section 402(p)] provided for United States Environmental Protection Agency (U.S. EPA) regulation of several new categories of nonpoint pollution sources within the existing NPDES Program.

c. Discharges to Groundwater Basins

Criteria for dischargeable allowances into groundwater basins in Butte County have been developed by the California Water Quality Control Board, Division of Water Quality. These requirements are used by responsible and reviewing agencies, including the County Department of Public Works, as criteria in granting NPDES permits. Any facility or activity that will discharge waste that may affect groundwater quality must also obtain waste discharge requirements which serve as a federal NPDES permit. The RWQCB evaluates NPDES permit applications to determine whether the proposed discharge is consistent with the adopted water quality objectives, the area-wide Waste Treatment Management ("208") Plan, the Basin Plan for Butte County, and the federal effluent limitations.

d. Irrigated Lands Regulatory Program

The RWQCB mandates the Irrigated Lands Regulatory Program (ILRP) to protect beneficial uses of water through waste discharge requirements for commercial irrigated lands. Growers must implement best practices to prevent sediment, fertilizer, pesticides, manure, and other materials used in farming from entering surface water or leaching below the rootzone to groundwater. ILRP is based on Senate Bill 390, passed in 1999, which required the RWQCB to develop programs to regulate agricultural lands according to the Porter-Cologne Water Quality Control Act. The program began in 2003 to regulate discharges and protect surface water and extended regulations to groundwater in 2012. Growers may comply through either the coalition option, in which they join a third-party coalition group who works with the RWQCB on behalf of the grower, or as an individual grower. The Sacramento Valley Water Quality Coalition, managed by the Northern California Water Association, is a non-regulatory entity providing support to non-regulatory individual sub-watershed groups, including the Butte-Yuba-Sutter Water Quality Coalition (BYSWQC), which assists growers in complying with ILRP requirements. The BYSWQC board is composed of three trustees from each county and staff from the Farm Bureaus of both Butte County and Yuba-Sutter.

2. Sustainable Groundwater Management Act (AB 1739, SB 1168, SB 1319)

In 2014, the passing of the Sustainable Groundwater Management Act (SGMA) created the requirements for governments and water agencies of high- and medium-priority basins to bring groundwater basins into sustainable yield and avoid undesirable results for groundwater users. High- and medium-priority basins designated in the Department of Water Resources (DWR) Bulletin 118 are subject to SGMA. Basin priority is based on factors such as current and projected population, amount of water supply wells, amount of irrigated acreage, degree of reliance on groundwater, and documented groundwater impacts like saltwater intrusion, overdraft, and subsidence. There are no low- or very low-priority basins in Butte County. Under SGMA, high- and medium-priority basins must reach sustainability within 20 years of implementing their Groundwater Sustainability Plans (GSPs). Failure to implement a GSP and/or failure to achieve sustainability would result in intervention by the State Board to manage the basin. Butte County overlies the Butte, Vina, and Wyandotte Creek subbasins, which are subject to the SGMA. The GSPs for these subbasins must be submitted by January 2022. Each subbasin has a different Groundwater Sustainability Agency (GSA). The Butte subbasin has 13 GSAs operating under their individual authorities. The Butte subbasin GSAs are working together through a Cooperation Agreement to develop and implement a single GSP for the Butte subbasin. The Vina subbasin includes the Vina GSA and the Rock Creek Reclamation District GSA. These GSAs entered into a Cooperation Agreement to develop and implement a single GSP for the Vina subbasin. The Vina GSA was formed by the County of Butte, the City of Chico, and Durham Irrigation District through a Joint Powers Agreement. Lastly, the Wyandotte Creek GSA is the exclusive agency authorized to implement SGMA in the Wyandotte Creek subbasin. The Wyandotte Creek GSA was formed by the County of Butte, the City of Oroville, and Thermalito Water and Sewer District through a Joint Powers Agreement.

3. Federal and State Safe Drinking Water Acts

The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources—rivers, lakes, reservoirs, springs, and groundwater wells. (SDWA does not regulate private wells that serve fewer than 25 individuals.) SDWA authorizes the U.S. EPA to set national health-based standards for drinking water to protect against both naturally occurring and human-made contaminants that may be found in drinking water. U.S. EPA, states, and water system providers then work together to make sure that these standards are met.

In 1976, California enacted its own Safe Drinking Water Act, requiring the Department of Health Services (DHS) to regulate drinking water, including:

- Setting and enforcing federal and State drinking water standards;
- Administering water quality testing programs; and
- Administering permits for public water system operations.

The standards established by DHS are found in the California Code of Regulations, Title 22.

Proposition 65, officially known as the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted as a ballot initiative in November 1986. The proposition protects California's drinking water sources from being contaminated with chemicals known to cause cancer, birth defects, or other reproductive harm, and requires businesses to inform Californians about exposure to such chemicals.

In 2018, Senate Bill (SB) 1422 was passed, which added the requirement that the SWRCB adopt a definition of microplastics in drinking water, and on or before July 1, 2021, adopt a standard methodology to be used in the testing of drinking water for microplastics and requirements for four years of testing and reporting of microplastics in drinking water, including public disclosure of those results. These requirements were added to Section 116376 of the Health and Safety Code.

4. Federal Energy Regulatory Commission Re-Licensing

The Federal Energy Regulatory Commission (FERC) licenses all non-federal hydroelectric plants, including the Lake Oroville facilities in Butte County. In February 1957, the Federal Power Commission, predecessor to FERC, issued a 50-year license to the DWR to construct and operate the Oroville Facilities Project (FERC Project No. 2100), located on the Feather River and entirely within Butte County. On January 26, 2005, DWR filed an application with FERC to continue to own, operate, and maintain the Oroville Facilities Project. FERC is reviewing this re-license application and considering the conditions to be placed on that license.

The principal features of the Project include the Oroville Dam and Reservoir, the Edward Hyatt Powerplant, Thermalito Powerplant, Thermalito Diversion Dam Powerplant, Thermalito Forebay and Afterbay, and associated recreational and fish and wildlife preservation and enhancement facilities. Lake Oroville, created by the Oroville Dam and two small saddle dams, is the principal water storage facility of the

State Water Project, which conserves and delivers water to over 23 million people in California.

The Oroville Dam, completed in 1968, is located 5 miles east of the City of Oroville. The Oroville Dam is the tallest and one of the largest earthen dams in the United States at a height of 770 feet and a crest (i.e., the top of the dam) that is 6,920 feet long. Lake Oroville has a total capacity of 3.5 million acre-feet. Coupled with four additional units in the Thermalito Powerplant, these facilities on average generate more than 2.3 billion kilowatt-hours of power annually.[2]

The existing license for the Oroville Facilities Project expired on January 31, 2007. The DWR is seeking a new federal license to continue generating hydroelectric power while continuing to meet existing commitments and comply with regulations pertaining to water supply, flood control, the environment, and recreational opportunities. DWR is proposing that the new license conditions be based upon a settlement agreement, which was released in March 2006. Water quality certification for the project was completed and issued on December 15, 2010. Until the FERC license is issued, the project operates under annual licenses, which extend the terms and conditions of the original license.

5. Local Water Supply Reliability

Statutes of 1995, Chapters 330 and 854 require local water agencies to assess the reliability of their water supplies. Statutes of 1995, Chapter 881 require consultation with local water agencies to determine if an adequate water supply is available to accommodate pending land use planning decisions. A number of loopholes in the 1995 regulations has prompted more recent requirements for local governments to demonstrate that adequate water supply is available to serve larger-scale development projects, and to accommodate planned development. Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221) amend State law to better coordinate local water supply and land use decisions, and ensure adequate water supply for new development. Both statutes require detailed information regarding water availability to be provided to City and County decision-makers prior to approval of large development projects, defined as those that include 500 residential units or more, or that would increase the number of the public water system's existing service connections by 10 percent. Both statutes also require this detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by the City or County on

[2] Historic range has been from 0.8 billion kilowatt hours in 1991 to 4.9 billion kilowatt hours in 1983.

such projects. Both measures recognize local control and decision making regarding the availability of water for projects and the approval of projects.

6. Enforcement of Wastewater Reclamation Criteria

Enforcement of Title 22 of the California Code of Standards is a responsibility of the RWQCB and the California Department of Health Services. The criteria established by the State are locally enforced by the Butte County Health Officer. In circumstances dealing with mining site reclamation, the California Division of Mines and Geology plays an active role.

7. Regulations for Water Use Efficiency

The California Constitution prohibits the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water. It also declares that the conservation and use of water "shall be exercised with a view to the reasonable and beneficial use thereof in the public interest and for the public welfare." Water Code Section 275 directs DWR and SWRCB to "take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste or unreasonable use of water."

8. Area of Origin Protections

Area of origin provisions were added to the California Water Code to protect local northern California supplies from being depleted by water projects. County of origin statutes reserve water supplies for counties from which the water originates when, in the judgment of the SWRCB, an application for the assignment or release from priority of State water right filings will deprive the county of water necessary for its present and future development.

9. Statewide Bond Measures

Over the past 20 years, a number of statewide bond measures have been brought to the ballot and approved by California voters, establishing funding for a wide range of water-related programs and improvements aimed at protecting the State's critical water resources.

Important among these are the Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act, passed in 2000. This bond authorized $1.97 billion for water projects to support safe drinking, water quality, flood protection and water reliability projects throughout the State. The SWRCB was authorized to allocate $763.9 million of these funds to local projects throughout California, mostly through competitive grant selection processes within a number of different programs. These include pollution control programs for coastal and inland waters, watershed protection programs and pesticide source and mitigation programs.

Passed in March 2002, Proposition 40, the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act authorizes over one billion dollars for a broad range of water conservation programs, including land acquisition. Later in 2002, an additional $3 billion in bonds were authorized by the voters as part of the Water Quality, Supply and Safe Drinking Water Projects bond measure. The bond funds are to be directed to a wide variety of water resource programs including the CALFED Bay-Delta Program, safe drinking water programs, and integrated regional water management programs, among others.

In November 2006 voters approved an initiative allowing the State to sell $5.4 billion in bonds for projects related to safe drinking water, water quality and supply, flood control, natural resource protection and park improvements.

On November 4, 2014, California voters approved Proposition 1, the Water Quality, Supply, and Infrastructure Improvement Act of 2014. Proposition 1 authorized $510 million in Integrated Regional Water Management (IRWM) funding. Funds are allocated to 12 hydrologic region-based funding areas. SGMA funding is provided partly through Proposition 1, which authorizes competitive grants for the development and implementation of groundwater plans and projects.

Proposition 68 is a $4 billion general obligation bond approved by California voters as the Parks, Environment, and Water Bond Act of 2018. Proposition 68 makes grants available related to drought, water, parks, climate, coastal protection, and outdoor access for all. Funding for SGMA is provided partly through Proposition 68. DWR is administering Proposition 68 funds for competitive grants for implementation projects that address drought and groundwater challenges to achieve regional sustainability; prevent or reduce the contamination of groundwater that serves as a source of drinking water; support water supply reliability, water conservation, and water-use efficiency; and support water banking, exchange, and reclamation.

B. Local Organizations and Regulations

1. Butte County Water Commission

The Water Commission meets monthly to discuss water issues of the county and provide recommendations to the Board of Supervisors for actions related to water resources, including the development of water policies. The Water Commission monitors and informs the Board of Supervisors of state and federal legislation and water policies. The Water Commission reviews water resource concerns, defines problems, and recommends solutions to water issues, and provides a venue for public input on water issues separate from the Board of Supervisors.

2. Butte County Department of Water and Resource Conservation

The mission of the Butte County Department of Water and Resource Conservation (BCDWRC) is to manage and conserve water and other resources for Butte County. BCDWRC is involved in a wide range of activities focused on water resources monitoring and planning. BCDWRC is responsible for developing some of the key water resource planning documents for the county, including a Groundwater Management Plan, as required by Assembly Bill (AB) 3030 regulations (see Section C.4.b), as well as a county-wide Integrated Water Resources Conservation Plan and policies and actions in the Water Element of the 2030 Butte County General Plan. BCDWRC also provides support for implementation of Chapter 33, the Groundwater Conservation Ordinance, and Chapter 33A, the Basin Management Objectives Ordinance. BCDWRC is also involved in developing and expanding the well-monitoring grid.

Other important roles include management of Butte County's 27,500 acre-feet of State Water Project allocation, and DWR contracts, including those the County holds with Del Oro Water Company and California Water Service Company; assessing Countywide water supply and demand from current and future users; participating in watershed planning activities with local watershed groups; and managing the BCDWRC's work on the SGMA.

3. Butte County Groundwater Conservation Ordinance (Chapter 33)

In November 1996, Butte County voters approved a groundwater conservation ordinance intended to provide groundwater conservation through local regulation of water transfers which move water outside of the county and have a groundwater component. Under this ordinance, a permit is required for both exportation of groundwater outside the county and groundwater pumping as a substitute for surface water exported outside the county. A permit for this type of water transfer outside of the county would be denied if the proposed activity would adversely affect the groundwater resources in the county, including causing or increasing overdraft of the groundwater; causing or increasing saltwater intrusion; exceeding the safe yield of the aquifer or related sub-basins within the county, cause subsidence or result in uncompensated injury to overlying groundwater users or other users. The Groundwater Conservation Ordinance restructured the Water Commission and the Technical Advisory Committee. Additionally, the Groundwater Conservation

Ordinance requires the County to monitor groundwater levels quarterly, monitor evidence of subsidence and saline intrusion, and report to the Board of Supervisors annually on basin conditions.

4. Butte County Basin Management Objectives Program (Chapter 33A)

The Butte County Basin Management Objectives Program was adopted in 2004 and included the development of basin management objectives (BMOs) associated with groundwater levels, groundwater quality, and land subsidence.

Briefly stated, the BMOs consist of locally developed guidelines for groundwater management that describe actions to be taken by well owners in response to well-monitoring data.[3]

The BMO program established alert levels based on the historic low groundwater elevation measurement at each well. The alert levels established through the BMO program are advisory and do not have any enforceable aspect.

A total of 16 sub-inventory units have been established with individual objectives, monitoring, and reporting parameters determined by local citizens. A key component of this effort has been the development of a grid of monitoring wells, and an interactive data reporting system available through the BCDWRC website. Additional information on the monitoring and reporting methods developed in conjunction with the Groundwater Conservation Ordinance are provided in Section II.D. The Basin Management Objectives Ordinance will sunset in 2022 due to the implementation of enforceable standards under SGMA.

C. Water Resource Planning

Increasingly, public agencies throughout California have started planning on a watershed scale to address land use change and development that affect water yield and water quality. While watershed-level planning and policymaking may be becoming more prevalent, the large number of agencies involved in water management within these larger geographic units can create its own challenges. In Butte County, a number of different federal, State, and local agencies, irrigation districts, and municipal water providers regulate and manage water resources.

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[3] Butte County Department of Water and Resource Conservation , Drought Preparation Plan, 2004. Chapter 5. Accessed at http://buttecounty.net/waterandresource/DroughtPrepPlan/Section%205.pdf, on May 28, 2007.

Case law has set the stage for a greater role for local government, including Butte County, in the area of groundwater management. Water ordinances have been approved by county voters, and sustainable groundwater management plans under State legislation have been prepared to support planning and use of water resources. The County also has broad land use planning and regulatory powers that can be used to help manage its water resources.

Other important tools in water resources planning in the county are described below:

1. Urban Water Management Plans (AB 797)

The Urban Water Management Planning Act, passed in 1983, requires urban water agencies serving more than 3,000 customers, or providing more than 3,000 acre-feet of water per year, to prepare an Urban Water Management Plan (UWMP). Currently, this applies to the California Water Service Company, serving Chico and Oroville; Del Oro Water Company, Paradise Irrigation District, Thermalito Water and Sewer District, and South Feather Water & Power Agency.

A key component of the UWMP is to identify existing water supplies and demands, as well as potential additional supplies to meet projected future demands, based on a 20-year projection. Plans are updated on a five year cycle, in years ending in zero or five, with the most recent plans to be submitted by July 2021. Many urban water agencies in the State, including the California Water Service Company and Del Oro Water Company have signed a Memorandum of Understanding (MOU) for urban water conservation. Signatories to the MOU are pledged to evaluate and implement cost-effective best management practices for water conservation.

2. Agricultural Water Management Plans (AB 3616)

According to the Water Conservation Act of 2009 (SB X7-7), large water suppliers (i.e., those serving more than 25,000 irrigated acres, excluding recycled water) must adopt and submit to DWR an Agricultural Water Management Plan (AWMP) that includes the status of specific Efficient Water Management Practices (EWMPs). The plans can be submitted by individual agricultural water suppliers or as collaborative regional plans. SB X7-7 does not require mid-sized agricultural water suppliers (i.e., those serving between 10,000 and up to 25,000 irrigated acres, excluding recycled water) to submit AWMPs unless State funds are made available for this effort. DWR provides for a range of options that may be used or implemented to comply with the SB X7-7 agricultural water volume measurement requirements.

3. Northern Sacramento Valley Integrated Regional Water Management Plan

In March 2014, the Northern Sacramento Valley Integrated Water Management Board, an organization embracing local governments, water agencies, and other groups associated with water resources and planning in the northern part of the State, adopted the North Sacramento Valley Integrated Regional Water Management Plan, covering much of the Sacramento River Hydrologic Region (as defined in the DWR's California Water Plan) from the Redding Groundwater Basin in the north to the Sacramento metropolitan area in the south. The Plan area encompasses all of Butte County as well as all or portions of the following counties: Colusa, Glenn, Shasta, Sutter, and Tehama. The Butte County Board of Supervisors unanimously passed a resolution of support for the Plan on September 14, 2010.

The Plan includes a list of foundational objectives:[4]

- Document baseline conditions and trends for surface water and groundwater resources.
- Quantify current and future water demands.
- Maximize efficient utilization and reliability of surface and groundwater supplies in coordination with local groundwater management plans (GMPs).
- Coordinate and protect regional groundwater resources consistent with locally developed GMPs that monitor groundwater levels, groundwater quality, and inelastic land subsidence.
- Develop regional water transfer guidelines to facilitate efficient management of water supplies that recognize the North Sacramento Valley Region as having the first priority for use.
- Protect existing and established surface water rights.
- Honor and preserve area-of-origin statutory protections.
- Protect existing and established regional Central Valley Project (CVP) and State Water Project (SWP) water contract supplies.
- Develop and coordinate flood risk reduction plans and projects consistent with current law and regulation to provide protection for agricultural, urban, and rural communities.

[4] https://nsvwaterplan.org/mdocuments-library/, Accessed on February 4, 2021.

- ♦ Preserve the autonomy of local governments, special districts, and tribes.
- ♦ Enhance communication and coordination among federal, State, tribal, and local governments and other stakeholders.
- ♦ Maintain a governance structure to update the Integrated Regional Water Management Plan (IRWMP) and support IRWMP project implementation.
- ♦ Coordinate with neighboring IRWMP regions to identify opportunities to enhance water management.
- ♦ Pursue funding opportunities to implement programs and projects consistent with the IRWMP.
- ♦ Coordinate IRWM activities with land-use planning.
- ♦ Conduct public education and outreach to promote IRWMP goals.
- ♦ Develop and disseminate information to protect regional water supplies.
- ♦ Disseminate information on flood risks, Federal Emergency Management Agency's (FEMA's) flood insurance rate maps (FIRM), and new FEMA policies.
- ♦ Develop and disseminate water quality information throughout the region.
- ♦ Develop and disseminate scientific information on aquatic, riparian, and watershed resources.

The Northern Sacramento Valley IRWMP was updated with Appendix N and adopted by the Northern Sacramento Valley Board in March 2020. The following objective was added under the Water Supply Reliability Goal:

- ♦ Adaptation to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.

4. Groundwater Planning and Management

Groundwater management typically encompasses a range of activities involved in the use, monitoring and preservation of groundwater resources including:

- ♦ Protection of natural recharge and use of artificial recharge;
- ♦ Planned variation in amount and location of pumping over time;
- ♦ Use of groundwater storage conjunctively with surface water from local and imported sources; and
- ♦ Protection and planned maintenance of groundwater quality.

a. Groundwater Modeling

The Butte Basin Water Users Association (BBWUA), an organization of water users, developed a detailed hydrologic model of the groundwater basin in the 1990s, the Butte Basin Groundwater Model, which was later transferred to the BCDWRC for use in its groundwater planning and analysis efforts. The model was intended as a critical tool to assess the groundwater resources of the Butte Basin to develop a quantitative hydrologic understanding of the groundwater system and evaluate regional hydrologic impacts on the aquifer system based upon various scenarios of withdrawal. Since its original development, the Butte Basin Groundwater Model has been updated several times, including transitioning it to the modeling code IWFM-2015, which is widely used throughout the state, and updating inputs on the hydrogeologic system and water budget to support development of GSPs. It is used to develop water budgets for the local implementation of SGMA; evaluate the effects on the aquifer system of groundwater withdrawal, climate change, and land use changes; and serves as a comprehensive water resources planning tool for the three groundwater sub-basins within Butte County (Vina, Wyandotte Creek, and Butte). Modeling can or has been used to evaluate the impact of transfers, artificial recharge projects, increased pumping from urban expansion, and wetland projects, as well as the effects of long-term drought conditions and climate change.

b. Groundwater Management Plans (AB 3030)

AB 3030 (Groundwater Management Act) was signed into law in January 1993, to facilitate coordinated groundwater management among agencies, and greater management authority for local agencies whose service area includes all or part of a groundwater basin, through development of a Groundwater Management Plan (often referred to as an AB 3030 Plan). Since adoption of SGMA, medium- and high-priority basins are prohibited from adopting or updating their AB 3030 Plans; however, until adoption of a Sustainable Groundwater Plan, AB 3030 plans are in effect.

In Butte County, the Biggs-West Gridley Water District; Butte Water District; Richvale Irrigation District; Thermalito Water and Sewer District; and Western Canal Water District, as well as the County itself, have AB 3030 plans in place, which outline the agencies' management activities and encourage coordinated management of the groundwater basin.

Groundwater management plans have a series of required components, including:

- ♦ Public participation.
- ♦ Stated Management Objectives (MOs).
- ♦ Mapping of the groundwater basin's area and the boundaries of other local agencies that overlie the basin.
- ♦ A plan for coordination with other agencies sharing in the groundwater basin.
- ♦ Components relating to the monitoring and management of groundwater levels, groundwater quality, subsidence, and changes in surface flow and surface water quality directly related to groundwater quality, quantity or pumping activity.
- ♦ Monitoring protocols capable of tracking changes in conditions for the purpose of meeting Basin Management Objectives (BMOs).

The requirement to prepare AB 3030 plans has not always resulted in implementation of comprehensive groundwater management programs, since many counties choose to rely on simple strategies, such as limits on exports, to address groundwater supply issues. In other cases, preparation of AB 3030 plans has led agencies to take a stronger role in groundwater management. Butte County has taken such a stance and has developed a Groundwater Management Plan for those areas not already covered by the Plan, and adopted a BMOs ordinance, which guides its groundwater planning activities. This ordinance is described in greater detail in Section B.4.

5. Water Resources Groups

A number of local groups and organizations have an active interest in Butte County's water resources and their use and have provided valuable insights into issues and concerns regarding water resources planning. Following is a sampling of some of the local organizations that are working to manage and enhance the use of water resources within the county. Many other local and regional groups, such as the Northern California Water Association, described previously, and various Statewide and national environmental and advocacy groups, continue to be involved with water resources planning in the County.

a. Big Chico Creek Watershed Alliance

The mission of the Big Chico Creek Watershed Alliance is to protect and enhance the ecological integrity and economic vitality of the Big Chico Creek watershed through cooperative efforts. In partnership with landowners, interested citizens, government agencies and private enterprise, the Alliance works to foster education, understanding, sustainable land management, and ecosystem and water quality restoration and conservation.[5] The Alliance published their Watershed Management Strategy on May 8, 2006 with the intention that it serve as a guide for the Alliance's activities. The Alliance is currently implementing aspects of their Strategy including watershed restoration projects near Bidwell Avenue, Iron Canyon, and implementing a citizen monitoring program.[6]

b. Chico Urban Streams Alliance

The Chico Urban Streams Alliance (Chico USA) is a coalition of the City of Chico and local interest groups concerned with the water quality of Chico's creeks. Chico USA coordinates a creek watch hotline and clean creeks projects. In 2005, Chico USA began the Clean Creeks Project, which has an objective to restore ecological health and improve water management by working with the community at a watershed level.

c. River Partners

River Partners works to create wildlife habitat for the benefit of people and the environment. River Partners focuses on large scale restoration projects on streams and rivers that span California's central valley, including the Sacramento, San Joaquin, Merced, Tuolumne, Feather and Stanislaus rivers. River Partners works with various agencies, institutions, and non-profit organizations in Butte County.

d. Butte Creek Watershed Conservancy

The Butte Creek Watershed Conservancy was established to protect, restore, and enhance the cultural, economic, and ecological heritage of the Butte Creek watershed through cooperative landowner action.[7] The Conservancy published its Watershed Management Strategy, a cooperative approach between various stakeholders to minimize resource conflicts and develop a future management strategy for the watershed.

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[5] Big Chico Creek Watershed Alliance, http://www.bigchicocreek.org/ index.php, accessed on May 16, 2007.

[6] Strachan, Susan. Executive Director, Big Chico Creek Watershed Alliance. Personal communication with Carl Nelson, Questa Engineering. May 16, 2007.

[7] Butte Creek Watershed Conservancy, http://buttecreekwatershed.org/, accessed on May 16, 2007.

e. Butte Environmental Council

The mission of the Butte Environmental Council is to provide environmental education and information referral services and advocacy. The organization's current water resource focus centers on responsible land use and development coupled with preservation of the environment.

f. AquAlliance

AquAlliance advocates for the protection of northern California waters from threats to the hydrologic health of the northern Sacramento River watershed, including attempts to divert water from the northern Sacramento River hydrologic region. AquAlliance focuses on protecting north state groundwater and wetlands to sustain family farms, communities, creeks and rivers, native flora and fauna, vernal pools, and recreation towards the objective of restoring the Sacramento/San Joaquin Delta.

g. Cherokee Watershed Group

Cherokee Watershed Group is mainly concerned with water quality, water quantity/supply, protection from groundwater overdraft, and the environmental impacts of mining. A particular concern of the group is that Butte County and Northern California will bear the burden of Bay/Delta solutions, with potential impacts to aquifers, water supply, and the existing groundwater extraction infrastructure.

h. Sacramento River Conservation Area Forum

The Sacramento River Conservation Area Forum brings communities, individuals, organizations, and agencies together along the Sacramento River from Keswick to Verona to make resource management and restoration efforts more effective and sensitive to the needs of local communities. The Forum supports quality restoration and serves as a forum for sharing information, a facilitator of solutions, and a partner for projects that protect both the natural values of the Sacramento River and the communities through which it runs.[8] In 1989, the council produced the *Upper Sacramento River Fisheries and Riparian Habitat Management Plan*, which included specific actions to improve Sacramento River fisheries and a conceptual plan for riparian habitat.

[8]Sacramento Conservation Area Forum, http://www.sacramentoriver.ca.gov/index.html, accessed on May 16, 2007.

To further develop the riparian plan, the council published the *Sacramento River Conservation Area Handbook* in 1998; this handbook contained action-oriented plans for riparian habitat in the conservation area. A direct outcome of the Handbook was the creation of a non-profit organization (NPO) comprised of one landowner and one public interest representative from each of the seven counties within the conservation area, as well as one public interest representative appointed by the Secretary of Resources. There is also a Technical Advisory Committee made up of agency representatives appointed by the NPO.

i. Big Chico Creek Ecological Reserve (BCCER)

The BCCER is over 3,950 acres and is a critical hub for restoration and forest health education. It exists as a learning laboratory for California State University (CSU) Chico courses, K-12 students, and other community members throughout the region. Planning for forest enhancement and water quality protection has been underway on the BCCER for the last 20 years. Students and faculty have contributed countless hours to water quality monitoring and ecological restoration in the form of surveys and hand thinning of overgrown vegetation.

j. Butte Creek Canyon Ecological Preserve (BCEP)

The BCEP is a 93-acre site along the middle section of Butte Creek. The site was formerly used for gold, sand, and gravel mining, and is recovering from those activities.

The property contains more than a mile of creek frontage, as well as habitat for many special-status species, including the western pond turtle and yellow-legged frog. Butte Creek is critical salmon habitat and spawning grounds for the largest population of Central Valley spring run Chinook, a state and federal threatened evolutionarily significant unit (ESU).

In December 1998, the Chico State Research Foundation purchased this site with grants from the U.S. Fish and Wildlife Service, National Fish and Wildlife Federation, CALFED (a consortium of state and federal agencies with management and regulatory responsibilities in the Sacramento-San Joaquin Bay Delta), and the Wildlife Conservation Board.

The goal of the preserve is to work in conjunction with other programs toward achieving a reasonable balance among the diverse demands on the resource base of the Butte Creek watershed.

The preserve has adopted an adaptive management approach to managing the property. Program areas at the preserve include habitat management and conservation, outreach and education, and research. The preserve is open to the public year-round.

II. Physical Setting

A. Geography

Butte County is in the Sacramento River Hydrological Region, which covers approximately 17 million acres (27,000 square miles) and extends south from the Modoc Plateau and Cascade Range at the Oregon border to the Sacramento-San Joaquin Delta. In addition to Butte County, the region includes all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa Counties. The region includes Sacramento River, the longest river system in the State of California, and its tributaries including the Pit, Feather, Yuba, Bear and American Rivers as its major tributaries.

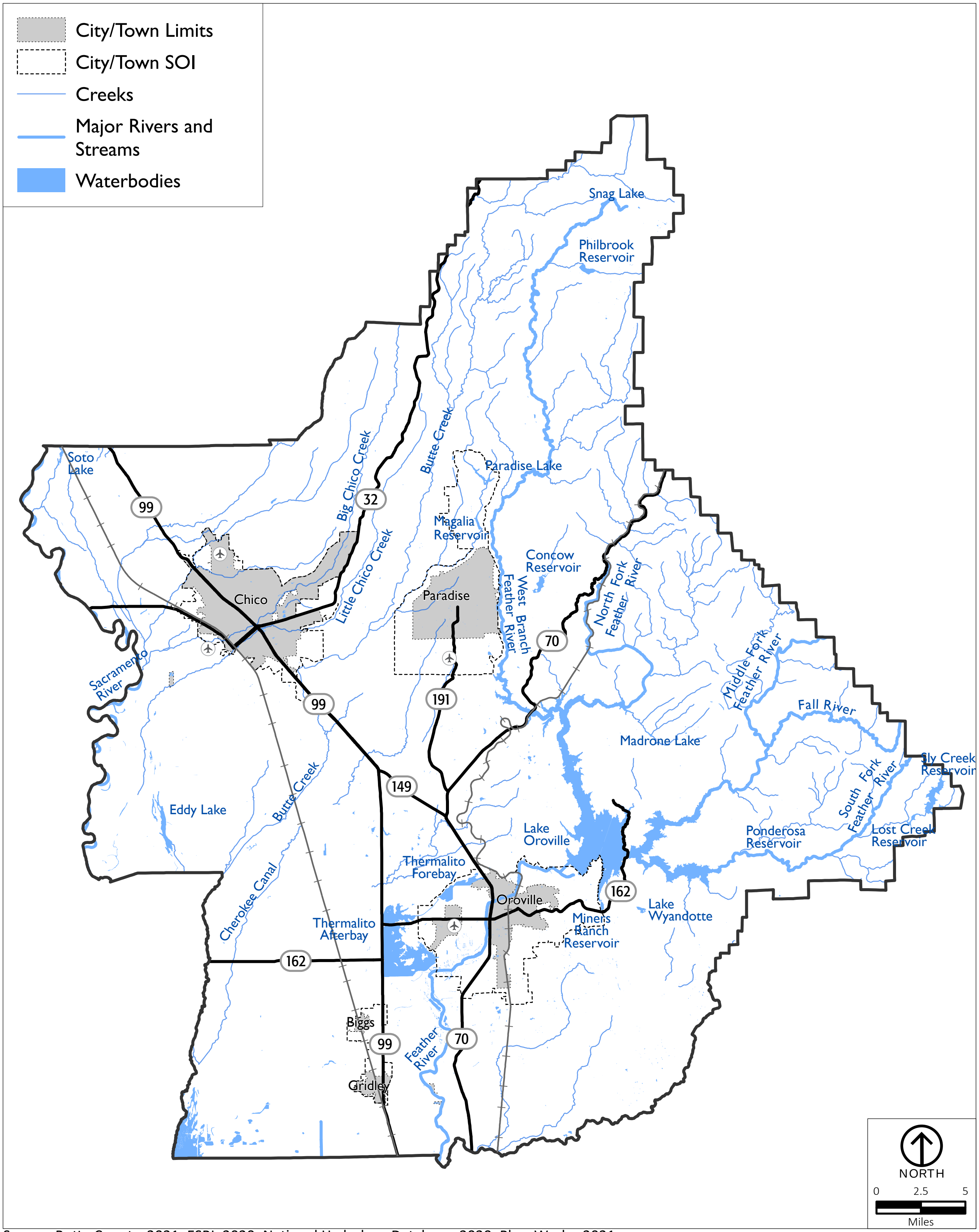
The Sacramento River Hydrologic Region includes the entire California drainage area of the Sacramento River (California's largest river) and its tributaries. The region extends from Chipps Island in Solano County north to Goose Lake in Modoc County. It is bounded by the Sierra Nevada on the east, Coast Ranges on the west, the Cascade and Trinity Mountains on the north, and the Sacramento-San Joaquin River Delta (Delta) on the south. The Sacramento River Basin begins in Oregon, north of Goose Lake, a near-sink that intercepts the Pit River drainage at the California-Oregon border.

The Sacramento River Hydrological Region is the main water supply for much of California's urban and agricultural areas. Annual runoff in the region averages about 22.4 million acre-feet (MAF), which is nearly one-third of the State's total natural runoff. Major water supplies in the region are provided through surface storage reservoirs. The two largest surface water projects in the region are the U.S. Bureau of Reclamation's (USBR's) Shasta Lake/Dam (Central Valley Project) on the upper Sacramento River in Shasta County and Lake Oroville (California Department of Water Resources' State Water Project) on the Feather River in Butte County. Municipal, industrial, and agricultural supplies to the region are about 8 MAF, with groundwater providing about 2.5 MAF of that total. Much of the remainder of the total runoff goes to dedicated natural flows that support various environmental requirements, including in-stream fishery flows and flushing flows in the Delta.

B. Surface Water

Figure 12-1 provides an overview of the major surface water features in Butte County, which lies entirely within the Sacramento River watershed. Primary waterways include the Feather River with its several branches, the Sacramento River, which forms the County's western boundary, as well as Butte Creek and Big Chico Creek. The majority of the surface water supply used by Butte County residents and businesses originates in the Feather River watershed, accumulates in Lake Oroville, and is primarily used for agriculture locally.

Key characteristics of the county's primary waterways are summarized in Table 12-1; additional information on some of the most significant of these waterways is provided in the following sections.



Source: Butte County, 2021; ESRI, 2020; National Hydrology Database, 2020; PlaceWorks, 2021.

FIGURE 12-1

SURFACE WATER FEATURES

TABLE 12-1 SURFACE WATER RESOURCES

Name	Location	Current Use/ Potential for Use
Big Chico Creek	North of Chico	Recreation, important wildlife habitat
Butte Creek	Butte Meadows to southwest county boundary	Irrigation, stock watering, recreation, important wildlife habitat, fisheries
Dry Creek/ Cherokee Canal	Near Paradise to southwestern portion of county	Water supply
Little Butte Creek	Northeastern portion of county	Water supply, wildlife habitat
Little Chico Creek	Northeast of Chico	Water supply, important wildlife habitat
Middle Fork Feather River	East of Oroville	Power, recreation, important wildlife habitat
North Fork Feather River	Northeast of Oroville	Power, recreation, important wildlife habitat, fisheries
Rock Creek	Northwest of Chico	N/A
Sacramento River	Western boundary of County	Irrigation, stock watering, important wildlife habitat, recreation, fisheries
Lake Oroville	Oroville	Recreation, power, irrigation, wildlife habitat.
Thermalito Forebay	Oroville	Recreation, power, irrigation, important wildlife habitat
Thermalito Afterbay	Oroville	Irrigation, important wildlife habitat, recreation

Source: Butte County, Water Inventory & Analysis Report, 2016.

1. Big Chico Creek

Big Chico Creek flows from the northern portion of the county through Bidwell Park within the City of Chico, and eventually into the Sacramento River near River Road.

A survey and special study by the California Department of Fish and Game (DFG) in 1989 found severe declines in fish populations (salmon and steelhead trout) from historic levels. The decline was largely attributed to agricultural pumping at the confluence of Big Chico Creek and the Sacramento River. Relocation of the pumps, and implementation of other measures have significantly improved the health of the stream.

2. Butte Creek

Butte Creek originates in the hills of Butte Meadows and flows through the southern portion of the cities of Chico and Durham to form the county border from Nelson Road south. This creek is used mostly for recreation and fishing in the upper reaches near Butte Meadows and in Chico and Durham. Southern portions of the creek provide stock watering and irrigation. The upper reaches of Butte Creek are characterized by excellent flow, temperature, and habitat conditions for salmon. In the past, diversion dams in lower Butte Creek have presented problems for fish migration and have impacted spawning grounds. However, since 1996, four major diversion dams were removed just below Highway 99, and other improvements have been made on Lower Butte Creek that improved the ability of salmon to migrate up this creek. Though salmon populations had decreased substantially in the past 30 years, their numbers have been rebounding due to these improvements and a series of wet winters. According to the California Department of Fish and Wildlife, out of the entire Central Valley, Butte Creek has the largest self-sustaining and natural spawning population of wild spring-run Chinook salmon.

3. Middle Fork of the Feather River

The Middle Fork of the Feather River is located east of Oroville and enters Lake Oroville north of Feather Falls. Within Butte County, a portion of this river has been designated as a National Wild and Scenic River. Although the steep canyons forming the river walls make access difficult, the river is host to various recreational activities and provides rich wildlife habitat.

4. North Fork of the Feather River

The North Fork of the Feather River flows southwest out of the Sierra Nevada into Lake Oroville. The river supports various recreational activities and a rich wildlife habitat. It also has excellent conditions for hydroelectric power generation and hosts nine hydroelectric facilities. Four additional hydroelectric facilities are proposed for tributaries.

5. South Fork of the Feather River

The South Fork flows southwest/west out of the Sierra Nevada. In Butte County, the South Fork is located east of Oroville and enters Lake Oroville at the Ponderosa Reservoir. The river provides a rich wildlife habitat that supports a variety of animal and plant species.

6. Sacramento River

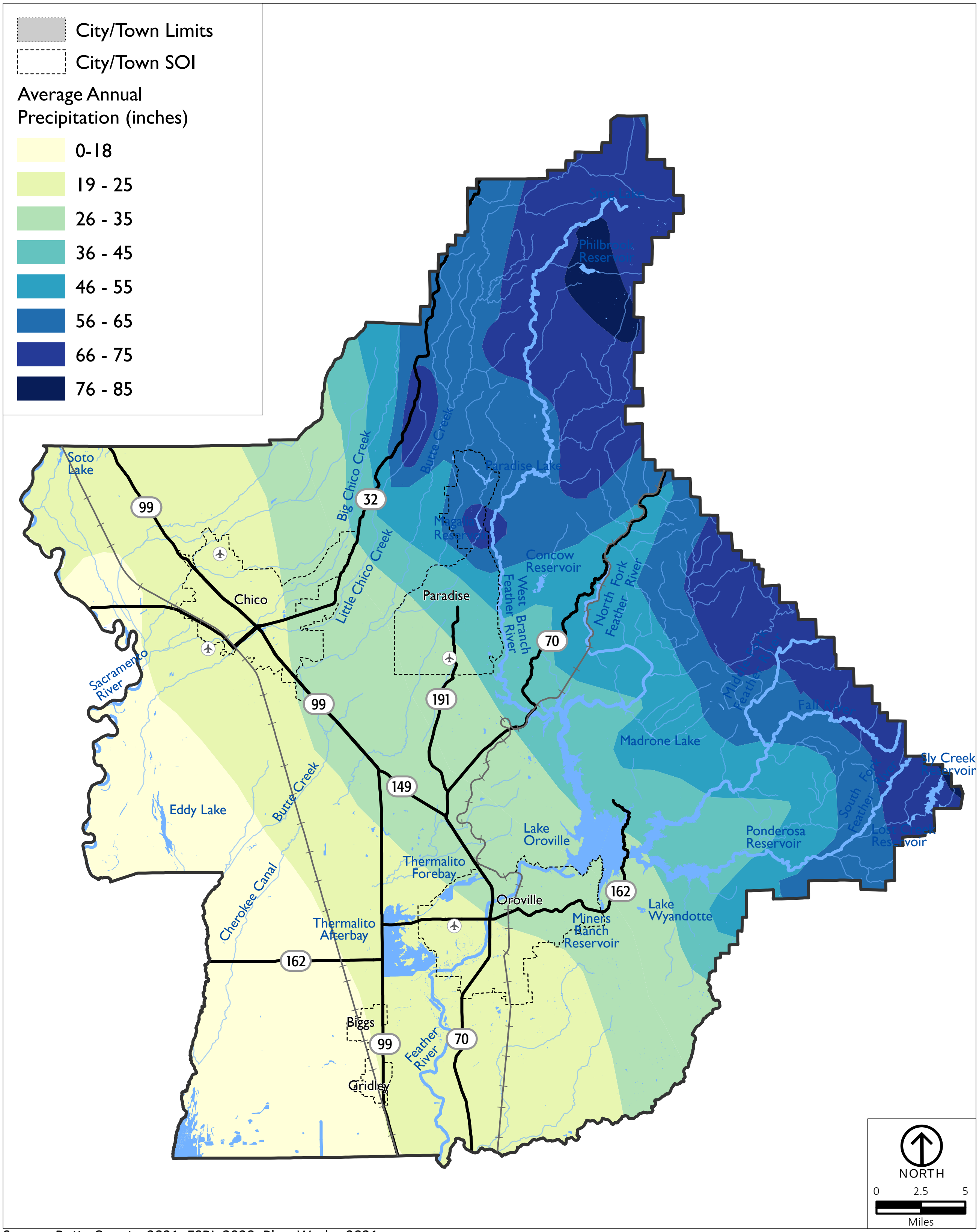
The Sacramento River forms the western boundary of the county and supports various recreational activities, agricultural irrigation, stock watering, and diverse wildlife habitats, including habitat for Special Status Species (federal and State-listed threatened and endangered species). The river has carved out wide flood plains outside both banks. In an effort to contain the river's floodwater, levees have been built along a large portion of its banks. The California Department of Water Resources, Division of Flood Management established the Sacramento River Flood Control Project to implement flood control projects for the entire Sacramento River system, including its tributaries. The main component of this project within Butte County is the Sacramento River Bank Protection Program.

C. Climate, Precipitation, and Flow Variability

Surface water flows in Butte County and the Sacramento Basin are extremely variable, both seasonally and annually, although their partial dependence on annual snow melt tends to mitigate the seasonal variability. Butte County includes the geographic provinces of the Sacramento Valley, and the foothill and mountain areas of the Sierra and Cascade ranges. The mountainous portions of the county comprise approximately a third of the county's land area and function as the major watershed area, though the foothill areas also collect considerable precipitation. Higher-altitude portions of the county receive abundant snowfall. Most of the annual precipitation occurs during the winter and spring. Conversely, the highest water usage is during the hot, dry summer months when agricultural irrigation is in progress.

Precipitation in different portions of the county ranges from less than 20 inches of annual rainfall in the western valley area to over 80 inches in the eastern Cascades and Sierra Nevada mountains. The presence of mountainous topography in the east of the county generates a strong orographic effect relative to precipitation between this region and the lower elevation valley areas. Moisture-laden weather patterns from the Pacific Ocean move east during the winter months, and orographic cooling occurs as the moving air mass is forced upward over the Sierra Nevada, resulting in condensation of moisture and precipitation. Up to 4,000 feet above sea level, most of the precipitation falls as rain. Above 4,000 feet, a considerable portion of winter precipitation occurs as snow. Variation in precipitation across the county is shown in Figure 12-2.

Table 12-2 shows minimums, averages, and maximums of annual precipitation and snowfall, based on measurements taken at four county weather stations. The figures shown in the table illustrate the seasonal variation in precipitation and variation in rainfall and snowfall over different elevations. For example, over twice as much rain is recorded annually at the DeSabla station, located at 2,700 feet above sea level, as in Oroville, which is at 171 feet above sea level. Figure 12-3 graphs seasonal variation in precipitation. As shown in the figure, precipitation is also highly variable



Source: Butte County, 2021; ESRI, 2020; PlaceWorks, 2021.

FIGURE 12-2

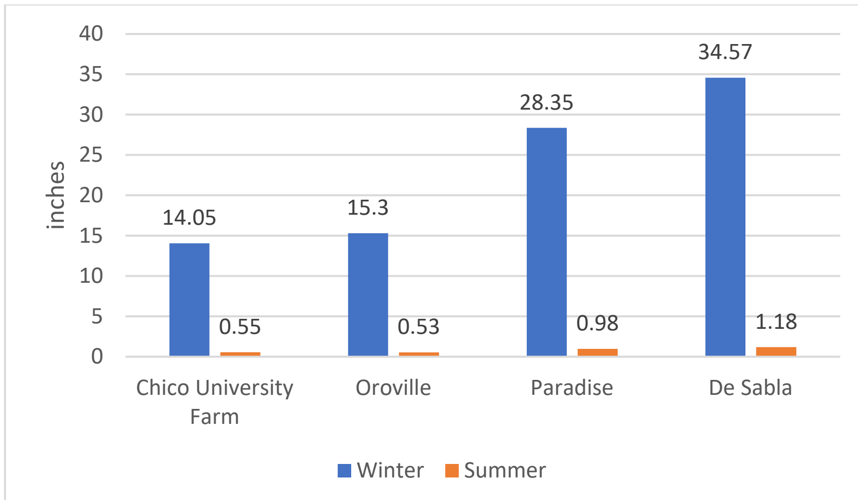
ANNUAL PRECIPITATION IN BUTTE COUNTY

TABLE 12-2 ANNUAL PRECIPITATION AND SNOWFALL AT FOUR STATIONS (INCHES)

	CSU Chico Farm	Oroville	Paradise	De Sabla
Elevation (feet above mean sea level)	185	171	1,750	2,710
Precipitation				
Average	25.66	28.38	54.56	63.52
Maximum	50.33	59.98	100.03	121.24
Minimum	10.40	11.84	18.20	17.34
Snowfall				
Average	0.06	0.14	1.99	23.56
Maximum	2	6	21.3	45.30
Minimum	0	0	0	0

Source: Western Regional Climate Center. Website: https://wrcc.dri.edu/. Accessed February 2021.

Figure 12-3 Average Annual Precipitation in Winter and Summer, Butte County Weather Stations



Source: Western Regional Climate Center. Website: https://wrcc.dri.edu/. Accessed February 2021.

seasonally, with about half the total annual precipitation occurring between November and February.

Table 12-3 shows a summary of monthly flow data at two streamflow measurement sites in the county. Both measurement sites demonstrate a wide variability in flow. For Big Chico Creek, the month of maximum flow was ten times higher than the mean flow rate. For Butte Creek, the maximum flow month was seven times higher than the mean flow rate, and the mean was nine times higher than the minimum flow month. The highest monthly flows occur between January and April while the minimum flows occur between July and October.

As well as being seasonally variable, surface water flow is highly variable on a year-to-year basis. A good indicator of annual surface flow variability in the region is the Sacramento River Water Supply Index. Based on the calculated runoff in million acre-feet, each year of the index is then classified as wet, above normal, below normal, dry or critical. Figure 12-4 graphs the Sacramento River Water Supply Index annually since 1906 and the classification of each year. The annual variability for the northern Sacramento Valley is quite pronounced, with wet years, dry years and critically dry years occurring frequently. This seasonal, yearly, and orographic variability creates the need for an extensive system of water storage and delivery, as well as well-developed water management techniques.

D. Groundwater

A majority of residential water supply in incorporated portions of the county is extracted from groundwater basins. The availability of groundwater in an area depends largely upon its geologic, hydrologic, and climatic conditions. In Butte County, reserves of groundwater are found in the thick sedimentary deposits of the Sacramento Valley Groundwater Basin. Groundwater can also be found in more limited amounts in mountainous areas of the county within fractures of volcanic, metamorphic, and granitic rock. Figure 12-5 maps the groundwater basin and sub-basins found within Butte County.

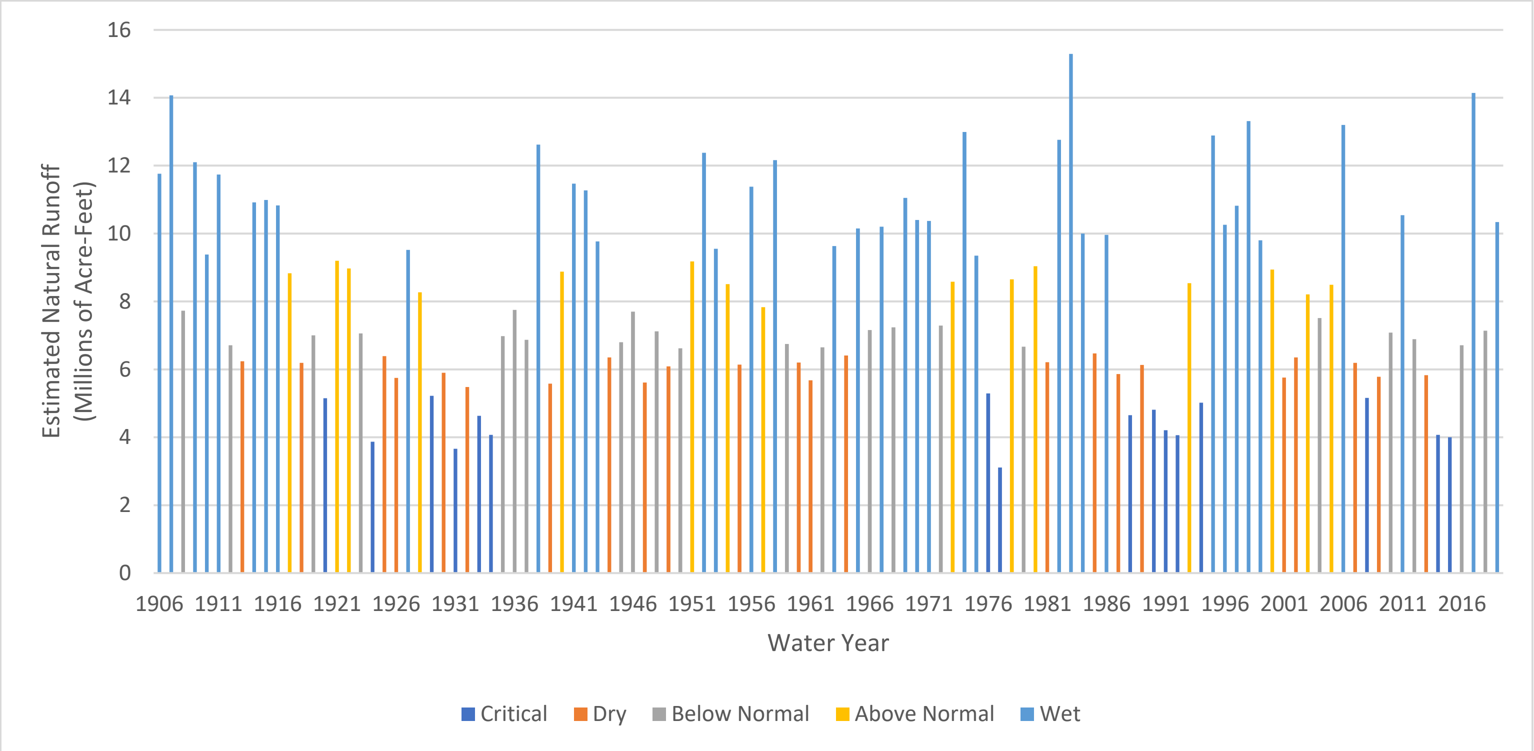
TABLE 12-3 COUNTY SURFACE WATER INFLOWS IN CUBIC FEET PER SECOND (CFS)

Month	Big Chico Creek Near Chico	Butte Creek Near Chico
January	327	662
February	390	793
March	324	765
April	220	762
May	90	490
June	43	283
July	29	166
August	25	134
September	24	117
October	36	133
November	83	211
December	216	465
Mean Monthly cfs	**149**	**407**
Maximum Monthly cfs	**1508**	**2,925**
Minimum Monthly cfs	**14.8**	**46.1**

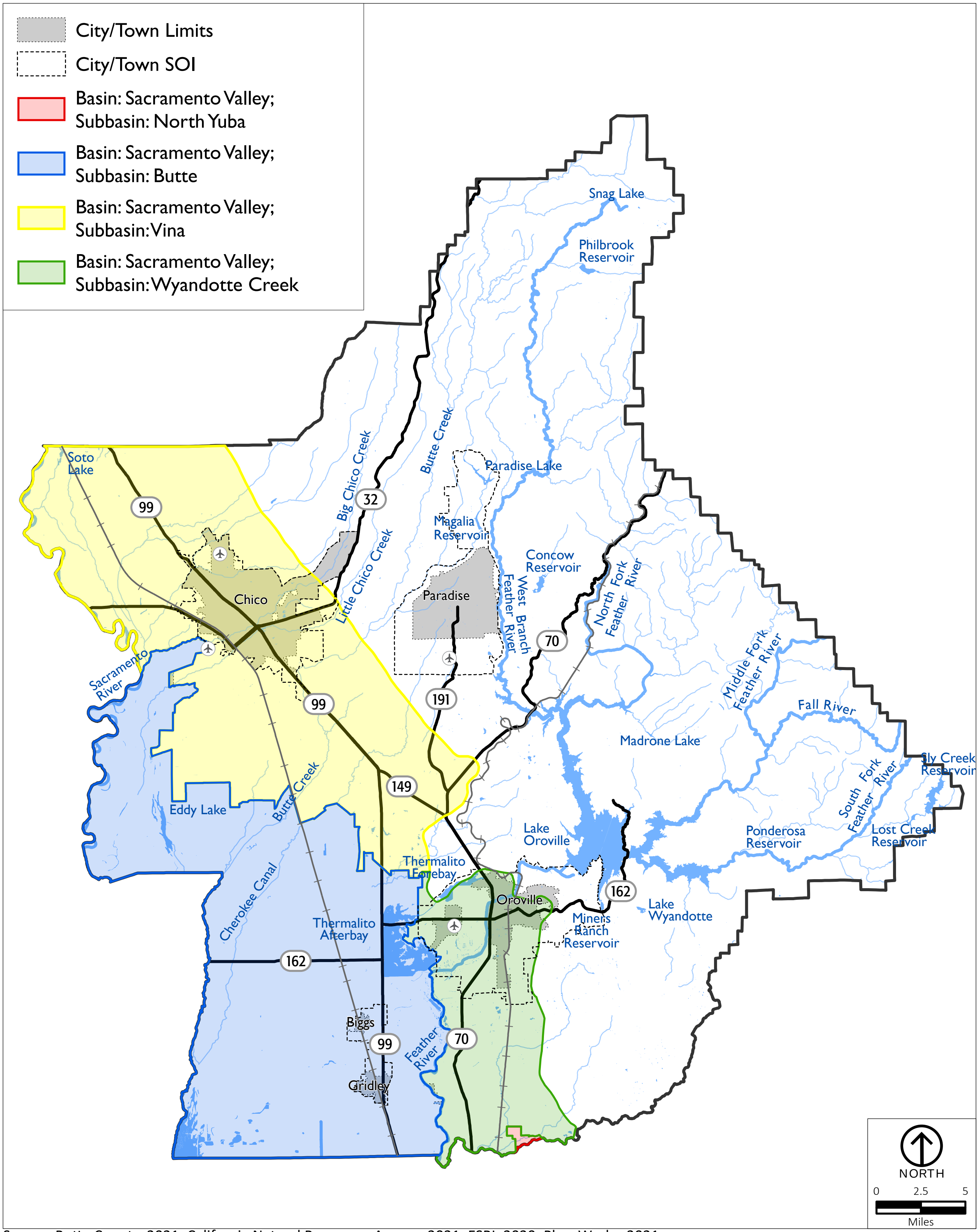
Source: U.S. Geological Survey. USGS Surface-Water Data for California. Website: https://waterdata.usgs.gov/ca/nwis/sw. Accessed February 2021.

Groundwater is stored in the pore spaces between particles of granular soil and rock materials, and in the joints and fractures of consolidated rocks. In coarse-grained material, such as sand and gravel, pores are more interconnected than those of clay or silt, facilitating the free movement of water. Fine-grained materials, such as clay and silt deposits, impede groundwater movement and do not readily yield water. Consolidated rocks provide storage space in their joint and fracture systems, which allow for groundwater movement and water yield. Only where wells directly intercept major joints or fractures do these aquifers provide dependable water sources.

Figure 12-4 Sacramento River Water Supply Index



Source: California Department of Water Resources, California Cooperative Snow Surveys, 2019.



Source: Butte County, 2021; California Natural Resources Agency, 2021; ESRI, 2020; PlaceWorks, 2021.

FIGURE 12-5

GROUNDWATER BASINS AND SUBBASINS

1. Groundwater Geomorphology

Butte County is composed of three primary geomorphic provinces in two categories: the mountain provinces (consisting of the Cascade and Sierra Nevada Geomorphic Provinces) and the great valley province (consisting of four subareas). The four great valley province subareas are:

- ♦ Dissected alluvial uplands;
- ♦ Low alluvial plains and fans;
- ♦ Floodplain and natural levees; and
- ♦ Flood basins.

Butte County has two primary groundwater resource areas: the groundwater-rich Sacramento Valley aquifer system and the mountainous areas to the east and north, which have restricted groundwater resources. These areas are described below.

a. Sacramento Valley

Although relative amounts of coarse-grained and fine-grained material in the alluvial deposits of the Sacramento Valley vary greatly in both the vertical and horizontal extent, in general, clay and fine-grained deposits far exceed those of coarse-grained materials. Coarser materials are deposited in foothill areas and in deeper zones where coarse-dominated materials of the Tuscan Formation occur at depth to the west near the Sacramento River. Finer materials are transported further into the valley and are more gradually deposited throughout the floodplain.

Groundwater is found in perched, unconfined, semi-confined, and confined zones in the valley portion of Butte County. Perched groundwater zones are most common in shallow, consolidated soils with low permeability. Major portions of groundwater are unconfined or semi-confined, occurring in the floodplain and alluvial fan deposits and in the Tuscan Formation. High permeability in these materials yield large amounts of water to relatively shallow domestic wells and irrigation wells. Well-sorted coarse sand and gravel of the Older Alluvium and Recent Stream Alluvium are highly permeable and yield large amounts of water to domestic and irrigation wells.

The Tuscan and Laguna Formations contain semi-confined and confined groundwater where it is overlain by flood-basin deposits. Toward the center of the Sacramento Valley, a confined deep zone of the Tuscan Formation is characterized by coarse-grained materials and interfingers with the finer-grained Tehama Formation originating from the west. Although moderate amounts of water are yielded from the fine-grained strata of the Laguna Formation, permeable sand and gravel zones are infrequent and minor in extent and thickness. The highest producing wells in alluvial uplands occur when Older Alluvium or the underlying Tuscan volcanic rocks are tapped.

b. Mountain Areas

The pre-Cretaceous rocks of the Sierra Nevada basement complex are consolidated, and therefore exhibit low permeability. The groundwater contained in these rocks exists only in the soil mantle, highly weathered zones, or openings formed by fractures, joints, and faults. In the ridge areas, the Cretaceous-age Chico Formation contains fresh groundwater. The connate water (that trapped in the rock at the time of its formation), which was saline or brackish, has been flushed out and replaced by potable groundwater, and deep wells on the ridges or in the canyons can tap this source. Weathered and open fractured rock can extend to several hundred feet deep. Shallow wells in perched zones typically yield only a few gallons per minute and can go dry during drought years.

Volcanic capped ridge areas having intervolcanic sand and gravel deposits and aquiferous gravels produce the most productive wells. Groundwater also occurs to a lesser extent in the soil mantle and weathered surface developed on the Tuscan rocks. Water in the surface zone is perched due to the impervious nature of the volcanic rocks. Perched groundwater is discontinuous from the water table, a discrete saturated zone that may be ephemeral (in direct response to precipitation in the immediate vicinity) or recharged by percolation from nearby surface water or other perched water zones. Perched groundwater may be a source of potable groundwater. The perched condition in areas with volcanic rock results in water flowing down-slope parallel to the ground surface and emerging in seeps along the canyon walls. Along the foothills, groundwater flows westward toward the Sacramento Valley and recharges the Tuscan sedimentary rocks beneath the younger valley deposits.

2. Groundwater Recharge

The major sources of groundwater recharge in Butte County are percolation of rainfall, infiltration from streams, subsurface inflow, and deep percolation of applied irrigation water in agricultural areas. Of the 3.77 million acre-feet of annual rainfall, less than half is used for irrigation or urban/industrial demand. Therefore, more than two million acre-feet become recharge or discharge via surface and subsurface outflow. Subsurface inflow from higher elevations and percolation of precipitation are the major sources of groundwater recharge in the mountain areas. Some recharge probably occurs adjacent to through-flowing streams in areas of deeper soils or alluvial deposits. Deep percolation of streamflow infiltration and precipitation are major sources of groundwater recharge in the valley. Most of this recharge occurs on alluvial fans where streams have sustained flow and the soil is highly permeable. In areas with clay soils or buried hardpan layers, high rates of surface runoff and ponding of water indicate locations where infiltration rates are low. Infiltration of surface runoff does occur in the lower foothill area and at the basin margin where Tuscan and fanglomerate rocks are overlain by valley deposits.

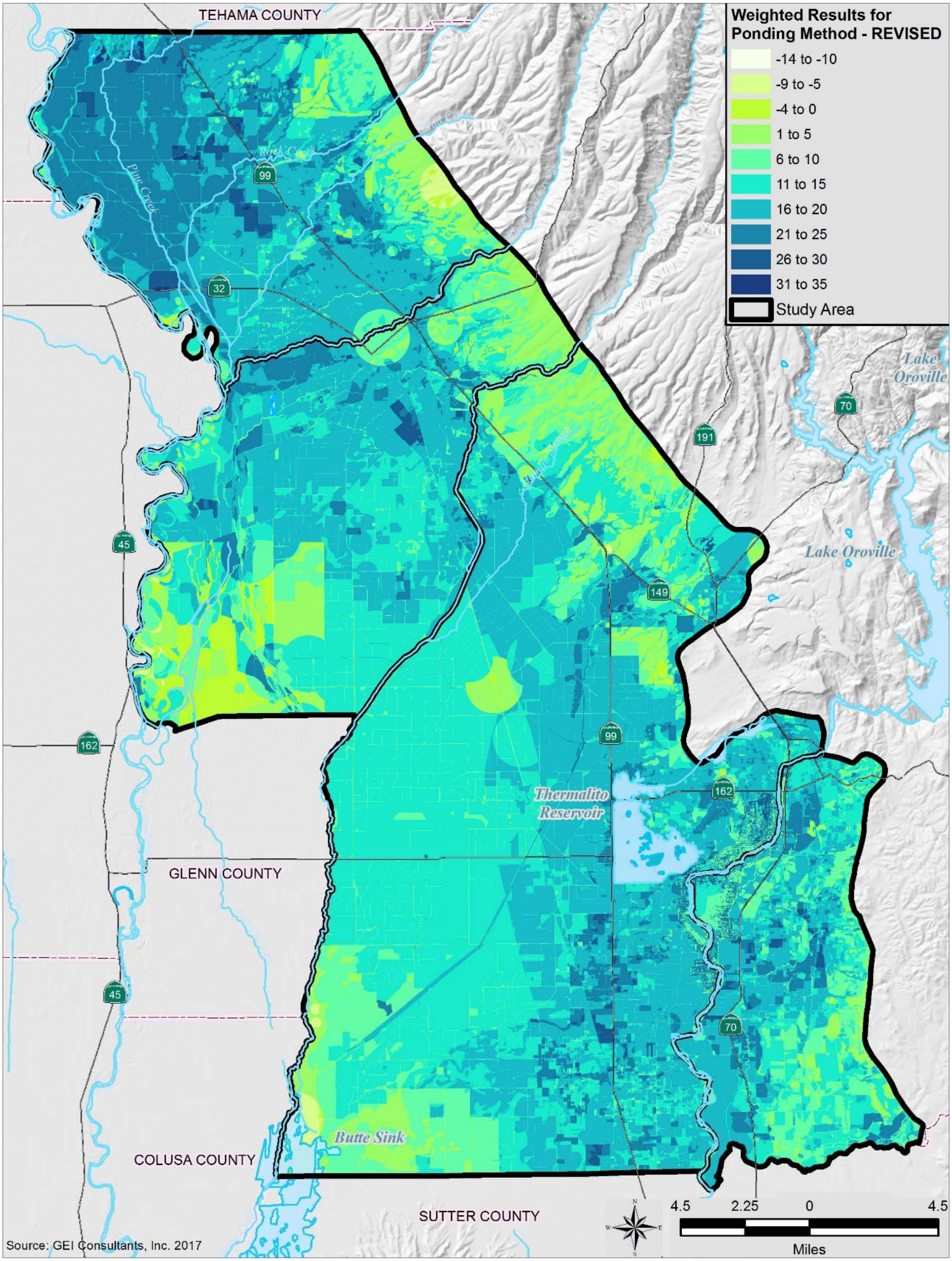
3. Groundwater Recharge Areas

The Tuscan Formation has been investigated by researchers since the early 1900s. The earlier studies helped define the expansive lateral extent of the Tuscan Formation in the subsurface of the northern Sacramento Valley and identify its hydrologic characteristics as a regional aquifer system and are important building blocks in developing our current understanding of the aquifer system and its hydrology. Since then, several studies funded by California water bonds have helped fuel the identification of groundwater recharge areas.

A 2018 report entitled *Evaluation of Restoration and Recharge within Butte County Groundwater Basins* focused on the identification and feasibility of both direct and in-lieu recharge of the groundwater basins within Butte County. A recharge constraints analysis was performed to identify superior recharge areas by scoring an array of physical characteristics, such as soil type, depth to groundwater, and geology, as well as anthropogenic (human-influenced) conditions that impact where recharge could be conducted. This analysis can be found in Figures 12-6 through 12-9.

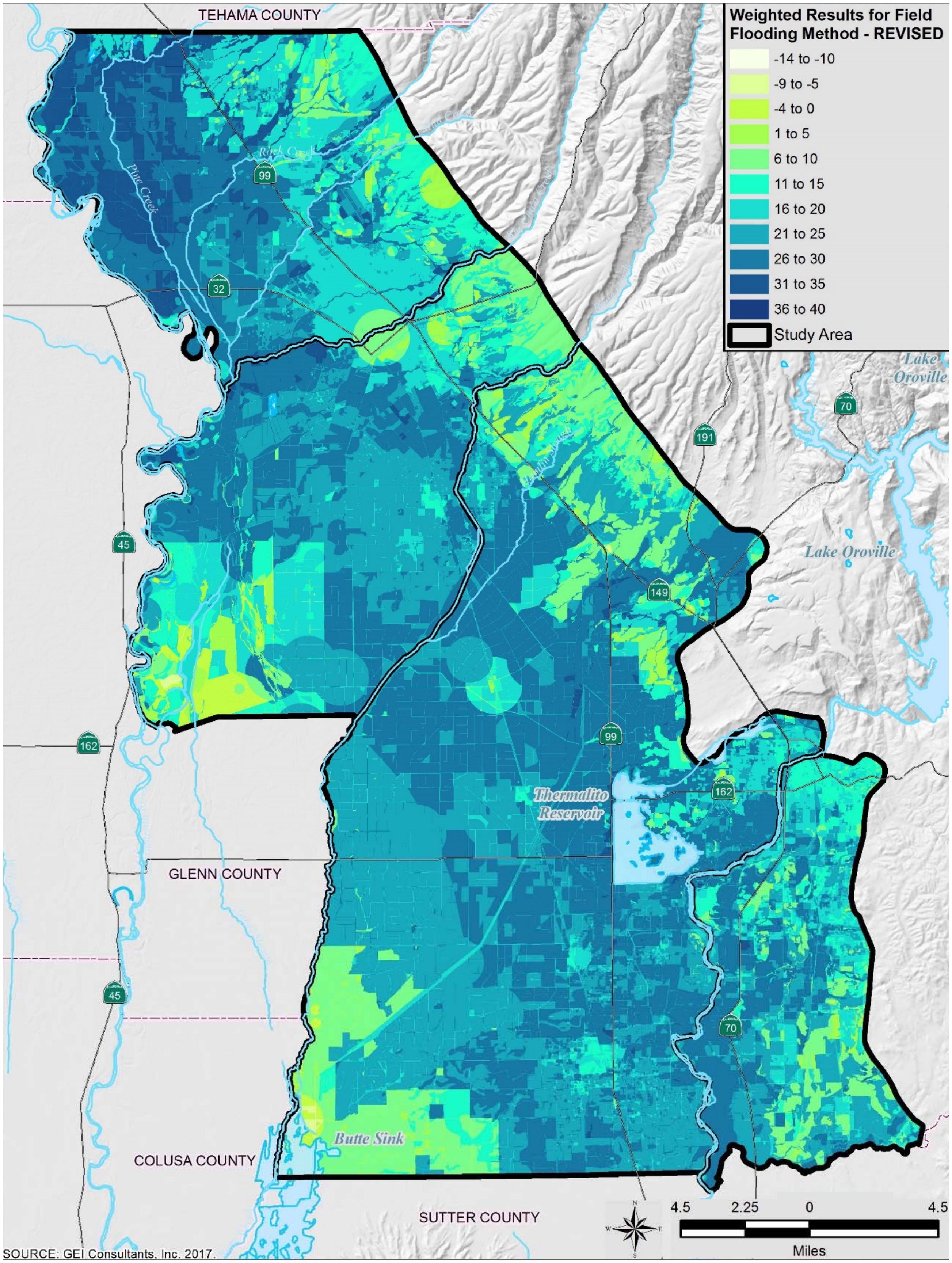
The report identified that planning and support of recharge programs designed to improve the use of currently existing water supplies are the strongest opportunity for encouraging groundwater recharge. This includes programs that encourage agricultural water users to install dual-source irrigation systems, policies that incentivize urban developers and property owners to install semi-permeable paving, and efforts to identify and advance local in-lieu recharge projects that would provide areas now partially or fully reliant on groundwater access to surface water supplies from willing local partners.

Major projects designed to make use of contracted water are appealing long-term options; however, implementation would require a substantial commitment of resources, negotiation of contracts with water purveyors, and negotiations with the USBR for those projects that intend to draw water from the Sacramento River.



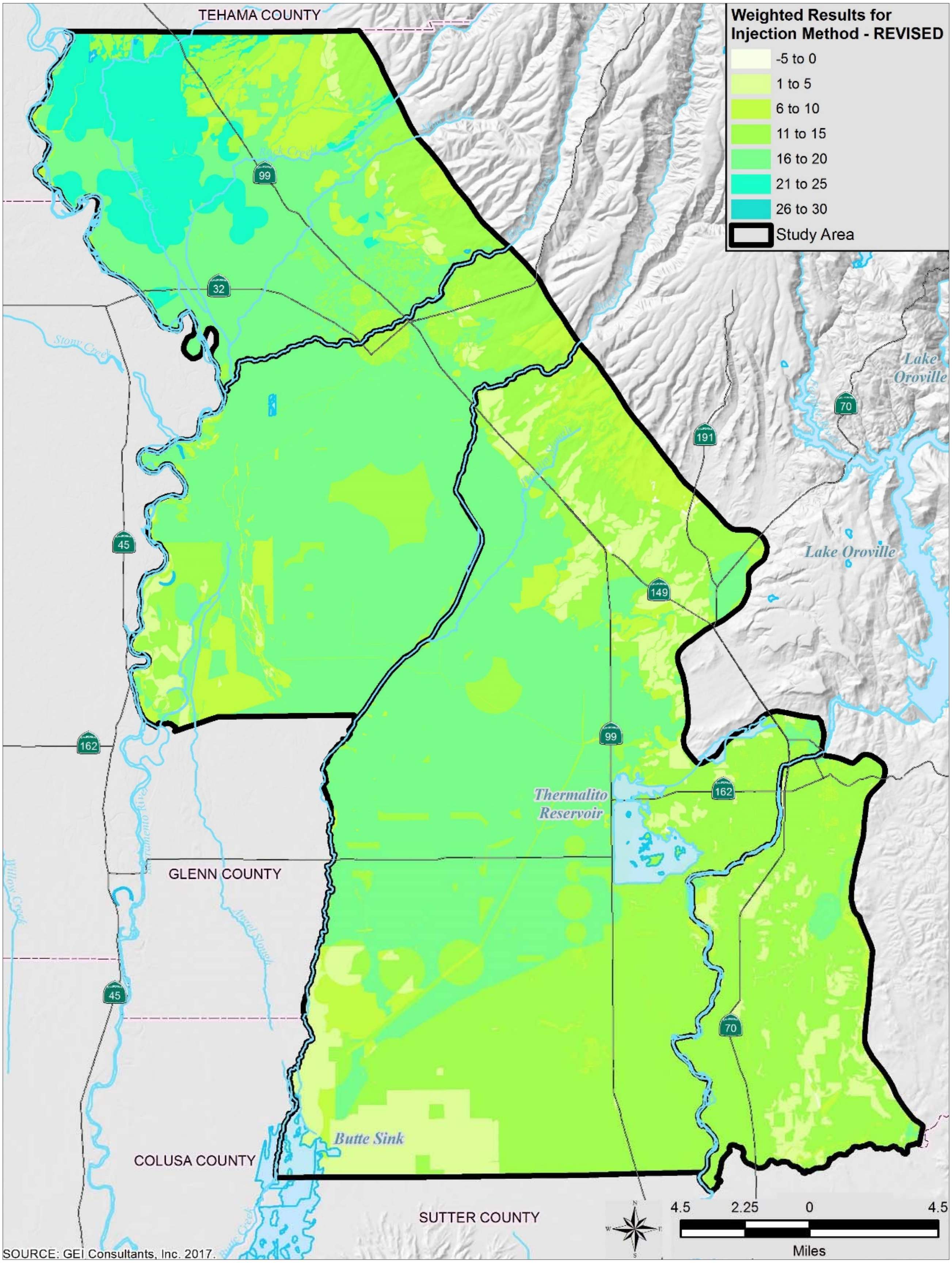
Source: GEI Consultants, Evaluation of Restoration and Recharge Within the Butte County Groundwater Basins, 2018.

Figure 12-6
Recharge Pond



Source: GEI Consultants, Evaluation of Restoration and Recharge Within the Butte County Groundwater Basins, 2018.

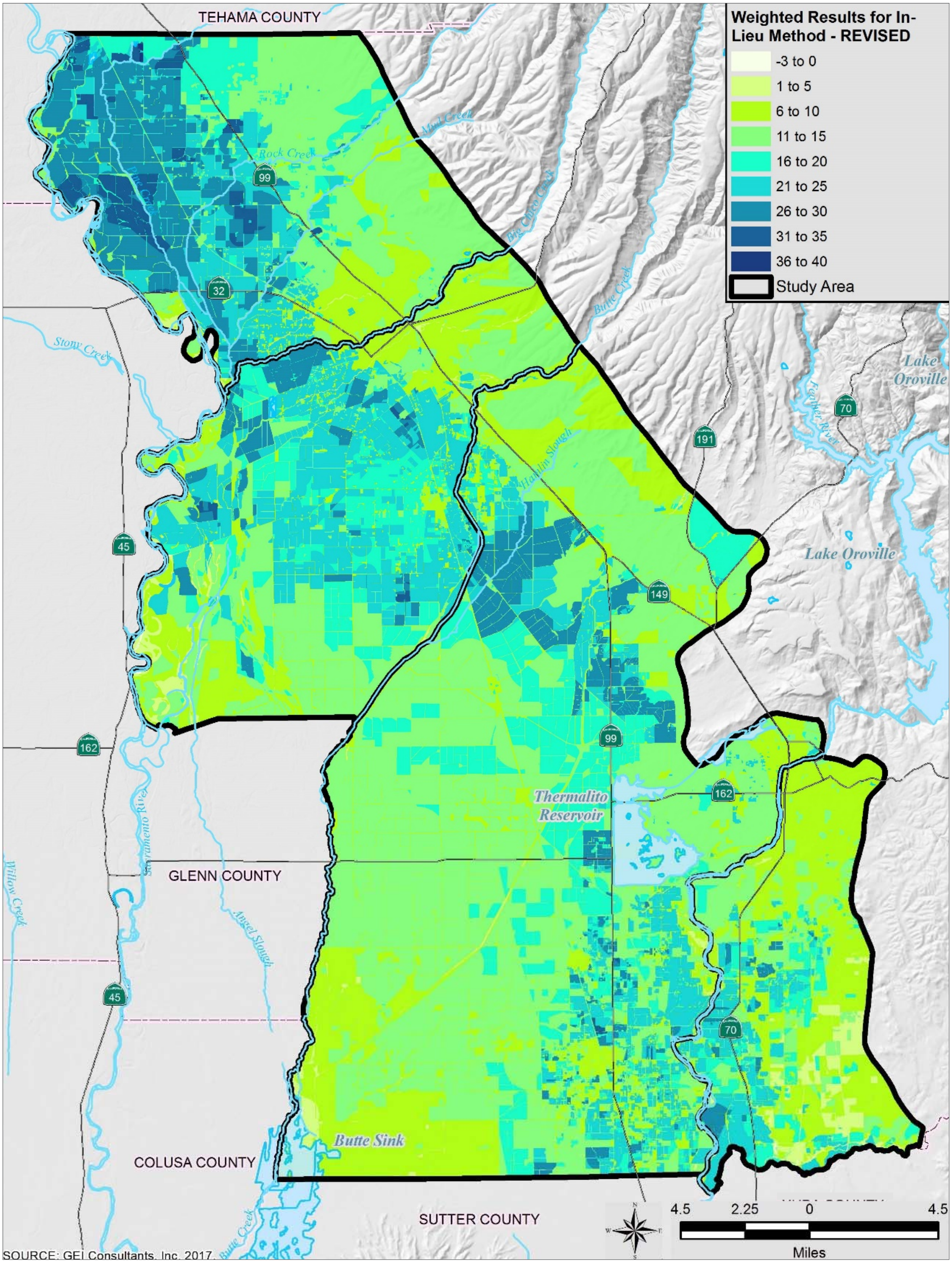
Figure 12-7
Field Flooding



Source: GEI Consultants, Evaluation of Restoration and Recharge Within the Butte County Groundwater Basins, 2018.

Figure 12-8

Groundwater Injection



Source: GEI Consultants, Evaluation of Restoration and Recharge Within the Butte County Groundwater Basins, 2018.

Figure 12-9

In-Lieu Recharge Constraints

4. Groundwater Levels and Movement

Throughout a large portion of Butte County, fresh water reportedly extends to a depth of 1,060 feet below the ground surface. Groundwater level conditions near the ground surface can change due to extraction and natural processes.

a. Seasonal and Yearly Changes in Groundwater Levels

Change in groundwater storage is most basically dependent upon the annual rate of groundwater extraction and the annual rate of groundwater recharge, commonly fluctuating within a given year and from year to year. During periods of drought, groundwater in storage typically declines, but increases during periods of above normal precipitation. Groundwater in storage declines during the summer as groundwater is extracted for municipal and agricultural use and recovers as extraction slows and seasonal precipitation increases recharge.

The annual spring-to-spring change in groundwater in storage for the Sacramento Valley portion of Butte County was estimated for a 14-year period from 2005 to 2018, a period that included a series of drought years between approximately 2012 and 2016. The analysis found that there was a net decrease in storage of approximately 3,340 thousand acre-feet (TAF), with approximately 2,330 TAF of that occurring during the 2012-2016 drought[9].

Seasonal fluctuation of groundwater levels in the unconfined portion of the aquifer system averages between three to five feet during years of normal precipitation, and up to 24 feet during periods of drought.[10] The annual fluctuation of groundwater levels in the confined or semi-confined portion of the aquifer system averages about 10 feet during periods of normal precipitation and about 20 feet during times of drought. Wells constructed in unconfined parts of the aquifer system tend to show less seasonal fluctuation in groundwater level than those in the lower, confined aquifer system because of the greater interconnection between the shallow groundwater and the surface-water systems and because of differences in the properties of the aquifer material. The areas of greatest groundwater level decline are those where groundwater is extracted for agricultural and/or municipal use during the summer months in the Vina groundwater sub-basin, including the Durham area and the Cherokee Strip portion of the sub-basin. Hydrographs indicate

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[9] California Department of Water Resources, March 2021. *California's Groundwater Update 2020 (Draft).*

[10] Butte County, Department of Water and Resource Conversion, June 2016. *Water Inventory & Analysis Report.*

that groundwater levels typically increase during the winter months due to recharge and recovery (when there is no agricultural pumping for irrigation).

Groundwater hydrographs for monitoring wells near Chico indicate a rather uniform seasonal fluctuation of 8 to 20 feet during normal years. During drought years, there tends to be a wider range of fluctuation depending upon the individual well. Wells in the southern portion of the county, in the Butte sub-basin, show less seasonal fluctuation than those in the northern county largely because of recharge of the upper aquifer system from applied surface-water and limited agricultural use of groundwater from the middle and lower aquifer system in the southern area of the county.

b. Long-Term Groundwater Level Change

Groundwater level declines on the order of 10 to 20 feet since 2004 have been observed in some areas of the County, primarily in the Vina sub-basin, over recent years and are likely driven mainly by drought conditions leading to reduced deep percolation (potential recharge) and increased groundwater pumping. A moderate decline of groundwater levels (5 to 8 feet since 2004) is observed in the southwest portion of the Wyandotte Creek sub-basin. Pumping estimates suggest that groundwater level declines in these areas may be related more to reduced recharge, rather than increased pumping, though the frequent occurrence of dry and critically dry years in the past decade has resulted in increased pumping. Pumping appears to be influenced more by interannual precipitation than to other factors such as increasing crop acreage or crop shifting over time.

c. Groundwater Movement

The overall pattern of groundwater movement during spring is southwesterly toward the Sacramento River, although the movement of groundwater varies locally. There are groundwater mounds just south of the Thermalito Afterbay and just west of Hamilton City, associated with the Stony Creek Fan, suggesting recharge from the Afterbay and from deep percolation of surface water. There are isolated areas of groundwater depression located under the City of Chico resulting from year-round pumping of groundwater for municipal use.

5. Groundwater Development

Groundwater provides about 30 percent of the water supply for urban and agricultural uses in the Sacramento Hydrologic Region, and has been developed in both the alluvial basins and the hard rock uplands and mountains. As described in the regulatory setting in Section I, the SGMA requires local agencies in high- and medium-priority basins to cease overdraft and bring their groundwater basins into a balanced state of pumping and recharge. Basins, once implementation plans have been adopted, must reach sustainability by 2040.

In general, well yields are good and range from a hundred to several thousand gallons per minute. In the mountain valleys and basins with arable land, groundwater supplements surface water supplies. Some rural mountain areas of the region are entirely reliant on groundwater for domestic supplies. However, the Paradise area is supplied principally from surface water sources. Table 12-4 summarizes the quantities of groundwater pumpage by sub-basin based on a historical average over a 19-year period from 2000 to 2018, and current (2018) data to represent current conditions.

There were over 17,500 wells in Butte County as of 2016. Table 12-5 shows the numbers of wells by type, inventory unit, and inventory sub-unit throughout the county.

6. Groundwater Monitoring

Groundwater level monitoring in the Sacramento Valley portion of Butte County is conducted by a number of private and public agencies, though historically the Department of Water Resources (DWR) has maintained the most comprehensive, long-term groundwater level monitoring grid. Since 1997, Butte County and DWR have coordinated groundwater level monitoring efforts through the work of the County Department of Water and Resource Conservation (BCDWRC).

TABLE 12-4 BUTTE COUNTY GROUNDWATER PUMPING CHARACTERISTICS (IN TAF)

	Vina		Butte		Wynadotte	
Land Use	**Historical**	**Current**	**Historical**	**Current**	**Historical**	**Current**
Agricultural	209,100	185,500	114,800	130,300	39,300	36,200
Urban & Industrial	26,500	20,100	2,300	1,800	700	500
Wetlands	8,000	3,500	25,100	35,700	7,100	6,400
Total	243,500	209,200	142,200	162,800	47,100	43,000

Sources:

Vina Groundwater Sustainability Agency. *Vina Subbasin Groundwater Sustainability Plan Draft Basin Setting*. August 2020.

Butte Subbasin Groundwater Advisory Board. *Butte Subbasin Draft Basin Setting and Monitoring Networks*. August 2020.

Wyandotte Creek Groundwater Sustainability Agency. *Wyandotte Creek Subbasin Draft Basin Setting and Monitoring Networks*. August 2020.

Butte County Department of Water Resource and Conservation. *Butte County Water Inventory and Analysis*. June 2016.

Note:

- Historical – 2000 to 2018. Current – 2018.
- Mountain and Foothill Inventory Units are not depicted due to the relatively insignificant amount of groundwater pumping .
- The Butte subbasin extends into Glenn and Colusa Counties and therefore represents a greater amount of groundwater pumping than may necessarily occur in Butte County alone.

TABLE 12-5 NUMBER OF WELLS BY INVENTORY UNIT AND INVENTORY SUB-UNIT

Inventory Unit	Domestic Wells	Irrigation Wells	Municipal Wells	Monitoring Wells	Other Wells	Totals
Vina	2,297	651	83	211	266	3,508
West Butte	1,471	751	70	432	290	3,014
East Butte	1,799	96	74	202	280	3,151
North Yuba	587	189	25	143	3	1,037
Foothill	3,437	86	37	130	132	3,822
Mountain	2,885	33	30	12	62	3,022
Total County	**12,476**	**1806**	**319**	**1130**	**1033**	**17,554**

Note: Municipal includes wells classified as Municipal and Public.

Source: Butte County Water Inventory & Analysis. June 2016.

A key component of the County's groundwater monitoring efforts was the adoption in 1996 of the Groundwater Conservation Ordinance, which was codified as Chapter 33 of the Butte County Code (see Section I.B.5). The chapter calls for a monitoring network to be established that defines monitoring parameters to facilitate a greater understanding of the subsurface aquifer, including groundwater elevations, groundwater quality, and subsidence. As of 2016, monitoring takes place four times per year at 140 well locations, with shared responsibility for monitoring of groundwater levels by DWR and BCDWRC. Sixty other municipal groundwater wells in the county are monitored by California Water Service at locations in Chico and Oroville.[11]

The County collaborates with agricultural irrigation districts supplied by surface water that also conduct monitoring programs. The Richvale Irrigation District approved the purchase of a continuous recorder to install on a well within their district. The County also coordinates with representatives of the Western Canal Water District, which has independently conducted water level monitoring since the summer of 1994.

III. WATER TREATMENT, CONVEYANCE, AND STORAGE

Butte County's residential, commercial, and agricultural water needs are met through a network of local water providers including municipal water departments, private water companies, irrigation districts, and community service districts. This section describes these providers and their facilities.

A. Water Suppliers

Adequate domestic water service for the county's urban population is crucial for public health, community sanitation, and fire protection. Water rights and resources are often the focus of public water policy, but water delivery systems and purveyors are important in achieving water resources objectives. Improvement, coordination, and expansion of water treatment and conveyance systems represent an opportunity to implement water resource conservation and other County water policies.

[11] Butte County Water & Resource Conservation Department; Presentation to the Sacramento Valley Water Awareness Workshop, March 22, 2007. Accessed on-line at www.buttecounty.net/waterandresource/WaterAwarenessWorkshop/KristenHard.ppt.

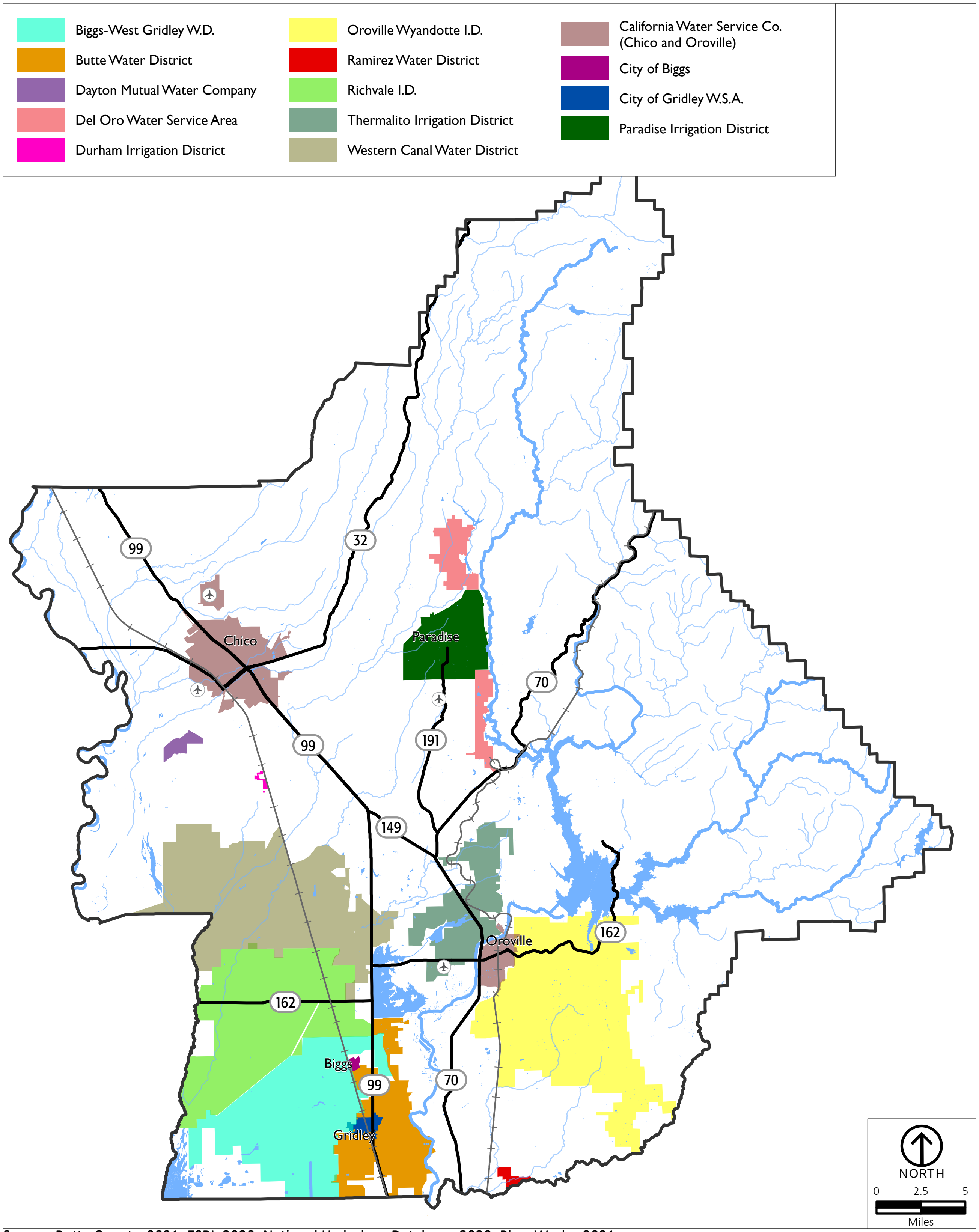
Local water companies and water districts manage domestic water supply in the county. This water supply includes water for drinking, residential, and commercial uses. A significant portion of domestic water is obtained through private residential wells. Mutual water companies are private corporations that perform water supply and distribution functions similar to public water districts, such as Cal Water Service Company. Investor-owned utilities may also be involved in water supply activities, sometimes as an adjunct of hydroelectric power development. Irrigation districts are designed to ensure delivery of sufficient water supplies for agricultural uses, though they may serve some residential and commercial uses.

Figure 12-10 maps the service area boundaries of the various public water systems and irrigation districts in Butte County, which include municipal water companies, mutual water companies, investor-owned utilities, and irrigation districts. Table 12-6 summarizes each of these entities in terms of their primary water supply source, primary end users, total deliveries, and numbers of users. More detailed descriptions of each agency and district, including planned, proposed, or required system improvements are provided in Section A.1 and A.2.

1. Municipal & Industrial Water Providers

a. California Water Service Company, Chico

California Water Service Company, Chico (Calwater Chico) is a private company that has been serving the water supply needs of the greater Chico area since 1926, when it purchased three smaller districts in the area. The greater Chico area includes some areas of Butte County as well as the City of



Source: Butte County, 2021; ESRI, 2020; National Hydrology Database, 2020; PlaceWorks, 2021.

FIGURE 12-10

WATER PROVIDERS AND SERVICE AREA BOUNDARIES

TABLE 12-6 WATER SUPPLIER OVERVIEW

	Water Type		Water Uses					
Water Supplier	**Surface Water**	**Ground-water**	**Agricultural**	**Municipal and Industrial**	**Environ-mental**	**Annual Delivery (TAF)***	**Storage Available (millions of gallons)**	**Population Served**
Municipal								
Calwater-Chico		✓		✓		25.9	5.2	102,155
Calwater-Oroville	✓	✓	✓	✓		4.85	7.209	10,400
City of Biggs		✓		✓		212	0.04	1,800
City of Gridley		✓		✓		497	0	6,561
Del Oro Water Company	✓	✓		✓		1.64	1.5	10,153
Durham Irrigation		✓		✓		0.345	0	1,300
South Feather Water & Power Agency	✓		✓	✓		172	48,164	17,000
Paradise Irrigation District	✓	✓	✓	✓		8,200	4,163	4,485
Thermalito Water and Sewer District	✓	✓		✓		11.2	2,025	11,000
Agricultural	✓							
Biggs-West Gridley Water District	✓		✓		✓	161	0	~
Butte Water	✓		✓		✓	133	0	~
Dayton Mutual Water Company	✓		✓					
Durham Mutual Water Company*	✓		✓					~
Richvale Irrigation District	✓		✓		✓	168.15	0	~
Western Canal Water District	✓		✓		✓	313.4		~

* Durham Mutual Water Company did not participate in the interviews or surveys.

Sources:

Water Inventory and Analysis Report, 2016. *Average annual 2000-2014

Final Municipal Service Review, Butte LAFCO Domestic Water and Wastewater Service Providers, June 1, 2006.

Chico. Although there are approximately 102,155 people in the service area, Calwater Chico does not provide water to the entire population within the service area because some are served by private wells. Supplied water is used solely for urban purposes.

Calwater Chico pumps groundwater at 68 active wells. The Cal Water system also includes nine storage tanks with a combined capacity of approximately 5.2 million gallons of water. The company supplied an average of 24.4 TAF a year during 2011 through 2015. In 2015, Calwater Chico supplied 18.2 TAF due to conservation efforts driven by State-mandated drought regulations and are likely to be continued and bolstered when the 2020 UWMP is anticipated to be adopted in July 2021.

Calwater Chico does not foresee any supply problems within its service area. Its management believes that the water supply is adequate for future growth. The company plans to drill additional wells and pump more water to fulfill higher future demands but is also actively investigating surface water opportunities and recycled water opportunities in the Chico area.

b. California Water Service Company, Oroville

California Water Service Company, Oroville (Calwater-Oroville) is a private water supplier that purchased a local water district in Oroville in 1927. Calwater-Oroville provides water within the Oroville city limits, except in areas served by other Oroville water suppliers (Thermalito Water and Sewer District and South Feather Water and Power Agency). The population within the service area is approximately 10,400. Almost all the water that Calwater-Oroville provides is dedicated to urban use (residential, industrial, and commercial). The company does provide agricultural water to farmers along the delivery canal. However, during a drought the agricultural users are the first to be cut back.

The average water quantity supplied by the company is 4.85 thousand acre-feet/year (TAF/yr). The peak daily use is approximately 6.3 MGD. The average daily use during high demand is 6.5 MGD. Calwater-Oroville has two reservoirs and two storage tanks, providing a total of 7.209 million gallons of storage. Conveyance losses are difficult to determine with any certainty because routine operations spill water from the system into the Feather River. Losses in the distribution system are a minor concern.

c. City of Biggs

The City of Biggs operates a public freshwater system providing clean water to residents and businesses for drinking, households, and irrigation. Three groundwater wells are operated by certified operators in the City's Public Works Department. Each well is closely monitored and controlled by high-tech state-of-the-art control systems. Water is delivered through the City through a subterranean network of interconnected pipes, over half of which were upgraded and replaced in 2007. Certified operators maintain the system daily and take weekly samples to testing labs. Very little treatment is required for Biggs' water, as the local groundwater sources are excellent in quantity and quality. The City consistently serves high-quality water to its residents and provides an annual water quality assessment report. The City recently completed a major water system upgrade, including replacement of approximately 30,000 linear feet of waterline mains; complete refurbishment of two wells; abandonment of the old elevated water tank; and installation of automated telemetry controls, automated emergency generator back-up, a 10,000-gallon hydropneumatic tank, new fire hydrants, and water meters. This project helped the operations costs of the Public Works Department by reducing maintenance caused by leaks within the old system. Additionally, the new upgrade improved service reliability and boosted water pressures citywide from the former 38 pounds per square inch (psi) to approximately 55 psi. The Fire Department has significantly greater ability to extract water from the system to fight fires. The City has a current adopted Water Master Plan.[12]

d. City of Gridley

The City of Gridley operates its own domestic water service and fire protection, serving approximately 2,027 municipal, commercial, and residential connections for a population of 6,561 people. Most connections are to residential users, and water is supplied from a series of six wells, which are capable of pumping approximately 6,280 gallons per minute (gpm). The City delivered 527.39 million gallons (MG) of water in 2004, with metered water deliveries totaling 485.81 MG. The maximum day demand peaked at about 2,500 gpm. The City does not operate any storage facilities, instead drawing from additional wells as daily demand changes. According to Butte County LAFCO's assessment of the City water supply for the 2006 Municipal Service review, it is an industry standard that a delivery system without storage should be capable of providing approximately 2.5 times its maximum day demand. Gridley's

[12] City of Biggs Water, available at https://www.biggs-ca.gov/City-Services/Utilities/Water/index.html. Accessed February 24, 2021.

water system currently meets this standard.[13] Although the City plans to drill additional wells to meet additional future demand, provision of storage facilities would offset some of this future need.

The quality of the City's drinking water supply is of some concern. Chlorination is applied at all wells to disinfect water prior to delivery. However, new standards were established for arsenic in January 2006, and it is believed that many, if not all of the City's wells will be over the maximum allowed level for that contaminant, and so additional treatment may be required. [14]

e. Del Oro Water Company[15]

Del Oro Water Company serves multiple unincorporated urban areas around the Town of Paradise, Stirling City, Magalia, and the Upper Stilson Canyon area northeast of Chico. Del Oro has five separate service areas: Buzztail, Lime Saddle, Magalia, Paradise Pines, and Stirling Bluffs. The service areas are separated geographically and by the sources of water they utilize.

The Buzztail District was acquired by Del Oro from Buzztail Community Services District at the end of 2015. Buzztail is 0.27 square miles with 35 metered service connections and is served by one groundwater well. The well was not metered prior to 2016, so production data is not available; however, 4.58 acre-feet were delivered to customers in 2015.

The Lime Saddle District is approximately 4.64 square miles, with 392 metered service connections (primarily residential). All connections are metered, and losses are not found to be significant. Lime Saddle has two groundwater wells, and also has a contract with Butte County for 300 acre-feet of surface water from Lake Oroville. With the completion of the Regional Intertie Project in 2012, Lime Saddle is able to draw, treat, and distribute sufficient water from Lake Oroville to serve the entire District. In 2015, Lime Saddle treated 128 acre-feet of water from Lake Oroville. In addition, Lime Saddle's two groundwater wells produced 66.51 acre-feet in 2015.

[13] Butte County LAFCO, Final Municipal Service Review, Domestic Water and Wastewater Service Providers, June 1, 2006.

[14] Butte County LAFCO, Final Municipal Service Review, Domestic Water and Wastewater Service Providers, June 1, 2006.

[15] Carvalho, Jennifer. Director of Community Relations, Del Oro Water Company. Personal email communication with Carl Nelson, Questa Engineering, May 18, 2007.

The Magalia District is 0.74 square miles with 280 metered service connections, which are primarily residential. Magalia has two groundwater wells, which produced 37.69 acre-feet in 2015. In addition to local groundwater wells, Magalia receives surface water from the Stirling Bluffs District. All connections are metered.

The Paradise Pines District is 7.17 square miles, primarily utilizes groundwater, and has 4,808 metered service connections. In addition to local groundwater wells, Paradise Pines receives surface water from the Stirling Bluffs District. The primary water service is for single family residential dwellings. Paradise Pines has four active groundwater wells, which produced 741 acre-feet in 2015. All connections are metered.

The Stirling Bluffs District is approximately 1.35 square miles with 164 metered service connections. Water use in the area is primarily residential. Stirling Bluffs has a contract to receive up to 365 acre-feet per year of water from PG&E through the Hendrick Canal. In 2015, they diverted 47.05 acre-feet of this water. All connections are metered.

The remaining water from Stirling Bluffs is available for transfer to Paradise Reservoir, which Paradise Irrigation District treats and wheels to Paradise Pines or Magalia. In 2015, of the 365 acre-feet Stirling Bluffs was contracted to receive, approximately 327 acre-feet was available to transfer. In 2015, Paradise Pines received 192.50 acre-feet and Magalia received 39.95 acre-feet. This water can also be wheeled to Lime Saddle in an emergency.

Del Oro maintains an agreement with Paradise Irrigation District (PID) for the purposes of procuring additional surface water for Lime Saddle, Magalia, and Paradise Pines when necessary. Del Oro last purchased additional surface water from PID in 2012, with 58.56 acre feet delivered to Lime Saddle. Since the completion of the Regional Intertie Project described above, Del Oro has not purchased water from PID. Del Oro does not expect to purchase water from PID again, barring an emergency situation.

f. Durham Irrigation District

The Durham Irrigation District (DID/District) provides domestic water services to approximately 350 parcels in an area south of the City of Chico. Distribution, testing and maintenance operations are currently contracted out to Cal Water Chico. The District's water comes from three groundwater wells. These have a maximum pumping capacity of approximately 4.176 MGD; in 2004, an estimated 142 MG was delivered, which equates to 0.39 MGD.[16] Although water supply has generally been adequate over the years, the water table has been subject to lowering during drought periods. Water in the system currently meets all State and federal drinking water standards, with all water chlorinated before delivery. According to the 2006 Municipal Services Review, the system's piping is old and in need of replacement.

g. South Feather Water and Power Agency

The South Feather Water and Power Agency (formerly the Oroville-Wyandotte Irrigation District) district encompasses 38,320 acres. It serves a population of 17,000 people, with 6,120 domestic water accounts and 525 irrigation accounts.

Supplied water is used for agricultural, residential, and commercial purposes. South Feather Water and Power Agency has six reservoirs: Forbestown, Little Grass Valley, Lost Creek, Miners Ranch, Ponderosa, and Sly Creek that provide approximately 172,064 acre-feet of storage.[17] Sly Creek Reservoir is fed partially by Slate Creek, which is part of the Yuba River system. Yuba County Water Authority receives water through the Forbestown Ditch from Sly Creek Reservoir. The remainder of the water is for South Feather Water and Power Agency use. There are three canal systems within the district that provide raw water to agricultural customers: Forbestown, Bangor, and Palermo. South Feather Water and Power Agency does not use groundwater but there are some pockets of land within the district that have independent private wells.

The agency's primary treatment plant is located at the Miners Ranch Reservoir and has the capacity to treat 14.5 MGD.

South Feather Water and Power Agency has both pre-1914 and appropriative water rights totaling 800 TAF, which is more water than is available from within the watershed. The district can take 172,145 acre-feet of water from the South Fork of the Feather River and the Yuba River and store it in its reservoirs. South Feather Water and Power Agency uses 27 TAF of water within their service area. The system is 100 percent metered (or volume-measured for raw water delivery systems, using instruments such as "miner's-inch" boxes).

[16] Butte County LAFCO, Final Municipal Service Review, Domestic Water and Wastewater Service Providers, June 1, 2006.

[17] South Feather Water and Power Agency, July 2006. *Urban Water Management Plan 2005*, page 7.

Losses within the domestic system are believed to be negligible. In 1990, there were up to 160 leaks per month due to the poor condition of the old steel pipeline system, but following completion of the steel pipeline replacement project, the Agency now experiences an estimated 3 to 5 leaks per month in the urban delivery system. Losses in the agricultural systems are more significant, with 93 percent in the Forbestown Canal, and approximately 30 to 50 percent in the Bangor and Palermo canal systems. South Feather Water and Power Agency has coated the canal areas with profuse leaks with concrete and fixed sections with major leaks. Consideration has been given to rehabilitating the entire ditch system, however there are approximately 100 miles of canal and rehabilitation would be expensive. The District would consider repairing the leaks if it could sell the water, but the cost of the infrastructure improvements and DWR transfer provisions have thus far made the project financially prohibitive.[18]

h. Paradise Irrigation District

The primary source of water supply is surface water from rainfall stored in two reservoirs with a total capacity of 12,293 acre-feet. The water system includes 169 miles of transmission and distribution pipelines and a 22.8 MGD state of the art treatment plant, constructed in 1994.

Paradise Irrigation District (PID) is in the Town of Paradise and serves a population of approximately 4,485, although the population served was much higher prior to the Camp Fire. PID was originally formed in 1916 under the laws of the State Water Code for the purpose of providing agricultural water to approximately 1,000 ridge residents. In 2010, the district used approximately 6,115 acre-feet of water within their service area, including water losses. Treated water in the district is used for both agricultural and domestic purposes, with approximately 3 percent of the district's water used to irrigate orchards in 2010.[19]

In 1956, the District constructed the new Paradise Dam and Reservoir, with a storage capacity of 8,350 acre-feet. The Dam was raised by 24.5 feet in 1976, which increased the capacity to 11,497 acre-feet. In 1996, seismic concerns in Magalia Reservoir forced the District to keep water levels below the maximum capacity, which reduced the capacity from 2,500 acre-feet to approximately 800 acre-feet.[20] The District

[18] Colwell, Matt, Water Division Manager, South Feather Water and Power Agency. Personal communication with Carl Nelson, Questa, May 15, 2007.

[19] Paradise Irrigation District, June 2016. *Urban Water Management Plan 2015*, page 17.

[20] Pacific Municipal Consultants, January 2007. *Draft CEQA Initial Study and Mitigated Negative Declaration*, page 2-7.

completed construction of a new water treatment plant in 1995 with the capacity to treat 22.8 million gallons of water per day. In 2007, the District completed the Magalia Bypass Project, which diverts raw water from Little Butte Creek upstream of Magalia Dam to the water treatment plant. The project provides water supply during any future upgrades to the Magalia Dam, improves water quality, provides water supply security, and reduces power consumption.[21]

i. Thermalito Water and Sewer District

Thermalito Water and Sewer District was originally organized as an agricultural water supplier in 1922. There are approximately 14,000 acres within the service area, with 4,000 to 5,000 acres being served by Thermalito. There is a population of approximately 11,000 in the District and 2,982 connections. The farmers that originally used the majority of the water in Thermalito farmed olives, figs, cotton, and oranges. Agriculture slowly declined within the District due to a combination of factors, including marginal soil. Thermalito now delivers only potable water to a combination of residential, industrial, and governmental users.

Thermalito obtains its surface water from the Concow Reservoir (also known as Wilenor Reservoir). The water enters the West Branch of the Feather River through Concow Creek, then is released from Oroville Dam and delivered to the District through the Thermalito Power Canal. Thermalito also has five groundwater wells that combine with surface water for a total capacity of 10 million gallons per day (MGD) (11.2 TAF/yr). However, it is more energy efficient to deliver surface water, so groundwater is used only as a backup. Last year, approximately 1,900 acre-feet of water were supplied within the service area. Thermalito obtained appropriative water rights in 1928 and 1929 to 45 percent of the stored water in Concow Reservoir, which amounts to a total of 7,225 acre-feet. In 1985, a SWRCB decision allowed the District to receive 8,200 acre-feet. Thermalito uses about 2,000 acre-feet of the 8,200 acre-feet water allotment.

The District stores some of its water in a 2.5 million-gallon storage tank in the distribution center, and another 7,225 acre-feet within Concow Reservoir. Losses of water within the District are believed to be insignificant. Thermalito discovered that many of the apparent leaks were caused by old meters, which had slowed down and were under-indicating the water delivered. As the old meters are replaced, calculations indicate that less water is lost throughout the system.

Thermalito also collects sewage within its service area, which is conveyed to a plant run by a Joint Powers Authority that includes Thermalito, the Sewer Commission Oroville Region (SCOR), and the Lake Oroville Area Public Utilities District. Together they send around 4.5 MGD of treated wastewater into the Feather River.

Thermalito has some concerns within its District. It is trying to extend water mains to vacant land to help accelerate development. The District also has estimated that the water treatment plant will need to be expanded within 8 to 10 years. The current capacity of the treatment plant is 4.5 MGD. The plant full build-out capacity is 10 MGD. During periods of high turbidity in the raw water, groundwater wells can be used to avoid excessive backwashing of the treatment plant filters. Groundwater wells can also be utilized to supplement plant output during peak consumption.[22]

2. Agricultural Water Providers

a. Biggs-West Gridley Water District

Biggs-West Gridley Water District occupies 34,785 acres of which 31,300 acres are irrigated for agriculture and managed wetland uses. The District also provides water to 8,500 acres of the Gray Lodge Wildlife Area, 2,600 acres of which are within their service area.

Some landowners within the district have backup wells to make up for water lost during droughts, or to provide all water during droughts so that the remaining surface water can be marketed. However, the district itself has no production wells, although it has up to 3,000 acres of "second status" lands that were brought into the District after 1979. During years when the California Department of Water Resources (DWR) reduces water deliveries, the second status lands are the first to have their water deliveries reduced.

Biggs-West Gridley is chronically short of water. In years when they are short on what is entitled, they have bought added supply from other districts within the Joint Board. They also have a recapture system that provides approximately 25 TAF and could serve as an additional drought management tool. There are no surface storage facilities within the district.

[22] Butte County, Department of Water Resources and Conservation, June 2016.. *Water Inventory & Analysis Report.*

Biggs-West Gridley has a system of open ditch canals to distribute water throughout their service area, and they estimate that the system loses one percent of its volume for every mile of conveyance from seepage, evapotranspiration, and associated losses. The conveyance system in Biggs-West Gridley is currently handling 700 cubic feet per second (cfs) of diversions during the summer, but it was not designed for this flow. In 2014, the USBR commenced construction to enlarge Biggs-West Gridley Water District's conveyance system to meet additional flow requirements associated with delivering new water (CVPIA water) to the Gray Lodge Wildlife Area. USBR's construction is planned over multiple years and will increase the District's capacity to a flow of 850 cfs.[23]

b. Butte Water District

The Butte Water District was established in 1956, and encompasses a total of just over 18,000 acres of agricultural land in unincorporated Butte County, south of the Thermalito Afterbay and west of the Feather River. The District supplies agricultural irrigation water to approximately 3,028 parcels. The District incorporates the Biggs/Gridley "Area of Concern" and development pressure in this area is expected to result in future conversion of some of the agricultural land in the District to residential and commercial uses.[24]

The Butte Water District is a member of the Joint Water District, formed under a Joint Powers Agreement with the Biggs-West Gridley Water District (BWGWD), Richvale Irrigation District and Sutter Extension Water District. Together, the Joint Water District has an allocation of about 555,000 acre feet, of which the Butte Water District is allocated 24 percent, or about 133,200 acre feet. The BWD uses a maximum of between 70 and 80 percent of its allocation, with peak summer demand of 100,00 acre feet, and only 10,00 acre feet during winter months.[25]

c. Dayton Mutual Water Company

Dayton Mutual Water Company provides surface water to meet the area's agricultural water needs. It has water rights to Butte Creek and the West Branch of the Feather River (diverted through Butte Creek) totaling 19.334 CFS.

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[23] Butte County, June 2016. Water Inventory & Analysis Report.

[24] Butte LAFCO, September 2010. *Final Municipal Service Review Update and Sphere of Influence Plan for the Butte Water District.*

[25] Butte LAFCO, September 2010. *Final Municipal Service Review Update and Sphere of Influence Plan for the Butte Water District.*

d. Durham Mutual Water Company

Durham Mutual Water Company was formed by area water users and provides surface water for agricultural uses from Butte Creek. Durham Mutual Water Company is part of the Butte Creek adjudication, and has first priority rights to 44.7 CFS. The water is diverted at Durham Mutual Dam, and is then conveyed to customers in the service area.

e. Richvale Irrigation District

Richvale Irrigation District has a riparian water right on Little Dry Creek for 18,300 acre-feet that can only be used between April and September. It also receives 150 thousand acre-feet from the Joint Board (described above) pursuant to pre-1914 water rights. The district encompasses a land area of approximately 33,000 irrigable acres in Butte County. Richvale distributes its water supplies annually during the irrigation season, commencing by charging its water distribution system with surface water supplies from Thermalito Afterbay in April each year, and completing its water distribution by October 31 each year. The district may continue water distribution from November to January for rice straw decomposition, to benefit wildlife habitat in the Butte Basin, and to comply with restrictions on rice straw burning.

Some groundwater pumping occurs within Richvale, which is used primarily as a supplemental source of water during the initial flooding of rice fields. Richvale does not have estimates of the quantity of groundwater pumped.

f. Western Canal Water District

The district encompasses a land area of approximately 59,000 irrigable acres in both Butte and Glenn Counties, with approximately 30,700 acres in the East Butte Inventory Unit and 14,000 in the West Butte Inventory Unit.

The supply is provided by two outlet structures located on the northwest corner of the Thermalito Afterbay. The maximum combined outlet flow is 1,250 cubic feet per second. The pre-1914 surface water rights comprise 150,000 acre-feet of natural flow from the Feather River and 140,000 acre-feet from Lake Almanor. There also exists a water right on Butte Creek for 11,400 acre-feet, which can be diverted only during the period of April 15 through June 15. There are approximately 200 agricultural connections to the district with the majority being for rice irrigation and some grain, pasture and orchard. Many landowners in the District have constructed deep wells (at their own expense) to provide a conjunctive-use capability. A number of the farms to the north of the main canal were entirely dependent upon groundwater supplies until canals and low-lift pumps were installed (at landowners' expense) to provide surface water supply. Groundwater use within the district boundaries is estimated to be 7,000 acre-feet. The conveyance losses within the district are estimated to be about five percent.

3. Storage Facilities

While the county is nearly devoid of natural lakes, there are numerous man-made impoundments that store some of the county's abundant surface water for water supply, as well as provide flood protection. Oroville Dam and reservoir on the Feather River is the second largest water storage facility in California and is the initial and largest reservoir of the State Water Project. Its waters serve many users, both within the county and beyond, including users in southern California.

a. Lake Oroville

Oroville Dam was completed in 1968 to serve as the headwaters to the California State Water Project. Oroville Dam is the highest earthen dam in the United States, standing 770 feet above the streambed and containing 22 square miles of surface water. Approximately one-third of the water volume stored in the lake is transported to southern California each year. Of the water conveyed from Lake Oroville through the aqueduct system, close to 60 percent is delivered south of the Tehachapi Mountains to southern California, just over 30 percent is supplied to the San Joaquin Valley for irrigation; and about 5 percent each is delivered to the southern San Francisco Bay Area, and to municipal and industrial users north of San Francisco Bay, in the Central Coastal area and near the Feather River.

Butte County has contracted with the DWR Oroville water supply to supplement existing municipal and industrial supplies. The County has an allocation of 27,500 acre-feet that was agreed upon as a mitigation measure for accepting the location of the Oroville Dam. The County wished to avoid paying for water it could not use, so it developed an agreement where the amount of water available each year would start at a low level and increase incrementally to the full allocation. There have been a series of amendments to delay the time when the full 27,500 acre-feet is allocated to the county because the county is still not ready to use the full allocation. Thermalito Water and Sewer District, South Feather Water & Power, Biggs-West Gridley, Western Canal, and Richvale water districts divert water through SWP facilities under their own water rights. Thermalito can divert 8,200 acre-feet a year and South Feather Water & Power can divert 17,555 acre-feet per year. Agreements have been made with Palmdale and Westside Water Districts to divert a portion of the County's State Water Project allocation for their use until 2031.

Aside from water deliveries for agriculture, municipal uses and power consumption, Oroville Dam is a major flood control and protection facility, and Lake Oroville supports many recreational uses, as well as irrigation, municipal water supply, flood control, and wildlife habitat. An ancillary use of the dam is the downstream Feather River Hatchery which was constructed to mitigate the loss of salmonid habitat resulting from the dam's construction.

In February 2017, a mass evacuation of over 180,000 people located downstream of Oroville Dam was ordered for a possible catastrophic flood, due to the projected near failure of the emergency spillway. The emergency spillway was used when the main spillway was discovered to have suffered severe erosion during releases. Releases from Lake Oroville had been increased due to rising lake levels due to inflow from heavy rains. Infrastructure repairs and reinforcements are ongoing.

b. Thermalito Afterbay

The Thermalito Afterbay was completed in 1968 and is located on the Feather River 4.5 miles downstream of Oroville Dam. The maximum operating storage of the reservoir is 13,350 acre-feet with a maximum water surface area of 320 acres. In addition to recreational uses, the Afterbay is used to divert water in Thermalito Power Canal for power generation at Thermalito Pumping Generation Plant. The Afterbay also serves as a warming basin for agricultural water supply.

c. Thermalito Forebay

The Thermalito Forebay was completed in 1968 and is an off-stream reservoir four miles west of the City of Oroville. The maximum operating storage of the reservoir is 57,041 acre-feet with a maximum water surface area of 630 acres. In addition to recreational uses, the Forebay is used to divert water in Thermalito Power Canal for power generation at Thermalito Pumping Generation Plant. [26]

d. Paradise and Magalia Reservoirs

Paradise Reservoir (also known as Paradise Lake) is located on Little Butte Creek about four miles north of Magalia in Butte County. The reservoir was formed by the construction of Paradise Dam in 1957 and is one of two reservoirs (Paradise and Magalia Reservoirs) that supply the Town of Paradise with water. The reservoir is also used for some recreational activities. The reservoir capacity is 11,500 acre-feet. In 1996, seismic concerns in Magalia Reservoir forced the District to keep water levels below the maximum capacity, which has reduced the capacity from 2,900 acre-feet

[26] State Water Project website, http://www.lakeoroville.water.ca.gov/about/swp.cfm, accessed on April 24, 2007.

to approximately 800 acre-feet. Following the 2018 Camp Fire, a significant number of water laterals and meters were melted and the loss of vegetation and soil erosion has increased sedimentation and reduced the natural and reservoir storage capacity.

e. Other Surface Water Storage Facilities

Butte County has numerous water storage reservoirs, some of which fall under the jurisdiction of the Department of Water Resources Division of Dam Safety. Table 12-7 lists dams within Butte County within jurisdiction of the Division of Dam Safety, including information on the dam name, owner, year completed, stream dammed and storage capacity.

4. Water Quality

The BCDWRC monitors groundwater temperature, pH, and electrical conductivity, the basic water quality characteristics needed to evaluate a basin for evidence of saline intrusion. The BCDWRC conducts this monitoring program under the requirements of the Groundwater Conservation Ordinance. Additional program elements were added under the Basin Management Objective Ordinance.

Groundwater temperature affects chemical reactions that may occur. Additionally, considerable changes in temperature could be an indication of other source waters migrating into the aquifer system, such as stream seepage or flow from a different aquifer system. Butte County has established a standard of within 5-degrees Celsius of the historic range (all but current year) of temperatures for a specific well.

Water with a low pH can be acidic, naturally soft, and corrosive, which can leach metals from pipes and fixtures and cause staining of clothes, sinks and drains. High pH drinking water does not pose a health risk but can cause build-up of scale in plumbing and reduced water heater efficiency. The U.S. EPA has set secondary drinking water standards (i.e., non-enforceable guidelines regulating contaminants that may cause cosmetic effects) for pH, which are between 6.5 and 8.5.

Electrical conductivity measures the ability of a solution, such as water, to conduct an electrical current due to the presence of ions. The U.S. EPA has set secondary standards of less than 900 and 700 μS/cm for drinking and agricultural water, respectively.

Water quality in Butte County has typically stayed within established standards. Water quality standard results are shown in Table 12-8.

The Basin Management Objectives Program will sunset on the deadline for Groundwater Sustainability Plan submittals, which is January 31, 2022. Butte County will continue water quality monitoring to evaluate for evidence of saline intrusion as required by the Groundwater Conservation Ordinance and described by the relevant Groundwater Sustainability Plans.

TABLE 12-7 DIVISION OF DAM SAFETY JURISDICTION, BUTTE COUNTY DAMS

Name	Owner	Year Completed	Stream	Storage Capacity (Acre-Ft.)
Al Chaffin	George Chaffin	1957	Cottonwood Creek Tributary	450
California Park	California Park Homeowners Association	1986	Dead Horse Slough	335
Cannon Ranch	Spring Valley Minerals	1870	Oregon Gulch Tributary	176
Concow	Thermalito Water and Sewer District	1925	Concow Creek	8,600
Desabla Forebay	Pacific Gas and Electric Co.	1903	Middle Butte Creek	280
Feather R Hatchery	State Department of Water Resources	1964	Feather River	580
Forbestown Division	South Feather Water & Power	1962	South Fork Feather River	358
Grizzly Creek	Mr. & Mrs. Ronald T. Dreisbach	1964	Grizzly Creek	76
Kunkle	Pacific Gas and Electric Co.	1907	West Branch Feather River Tributary	253
Lake Madrone	Lake Madrone Water District	1931	Berry Creek	200
Lake Wyandotte	South Feather Water & Power	1924	North Honcut Creek	1,300
Lost Creek	South Feather Water & Power	1924	Lost Creek	5,680
Magalia	Paradise Irrigation District	1918	Little Butte Creek	2,900
Miners Ranch	South Feather Water & Power	1962	North Honcut Creek Tributary	912
Oroville	State Department of Water Resources	1968	Feather River	3,537,577
Paradise	Paradise Irrigation District	1957	Little Butte Creek	11,500
Philbrook	Pacific Gas and Electric Co.	1926	Philbrook Creek	5,180

TABLE 12-7 DIVISION OF DAM SAFETY JURISDICTION, BUTTE COUNTY DAMS **(CONTINUED)**

Name	Owner	Year Completed	Stream	Storage Capacity (Acre-Ft.)
Poe	Pacific Gas and Electric Co.	1959	North Fork Feather River	1,150
Ponderosa Division	Oroville Wyandotte Irrigation District	1962	South Fork Feather River	4,750
Round Valley	Pacific Gas and Electric Co.	1877	West Branch Feather River	1,147
Sly Creek	Oroville Wyandotte Irrigation District	1961	Lost Creek	65,050
Thermalito Afterbay	State Department of Water Resources	1967	Feather River Tributary	57,041
Thermalito Diversion	State Department of Water Resources	1967	Feather River	13,328
Thermalito Forebay	State Department of Water Resources	1967	Cottonwood Creek Tributary	11,768

Source: Butte County, Water Inventory & Analysis, 2016.

California Water Service Company also supplies water quality testing information for its Chico and Oroville Districts. No violation of water quality standards occurred in 2019.

TABLE 12-8 BUTTE COUNTY WATER QUALITY

Area	Well Name	Well Type	pH (U.S. EPA Secondary Standard or Secondary WQ Threshold of 6.5 to 8.5)			Electrical Conductivity (U.S. EPA Secondary Standard or Secondary WQ Threshold of < 900 µS/cm for drinking water, < 700 µS/cm for agricultural water)			Temperature		
			2020 Results	Historic Range over 19 years	Historic Average over 19 years	2020 Results	Historic Range over 19 years	Historic Average over 19 years	2020 Results	Historic Range over 19 years	Historic Average over 19 years
Butte	Biggs-West Gridley	agricultural	7.7	7.0 - 7.9	7.6	296	288 - 382	326	19.0	18.0 - 20.5	18.8
Vina South	Cherokee	agricultural	7.2	6.9 - 7.6	7.3	295	215 - 330	263	21.2	20.7 - 22.4	21.4
Vina Chico	Chico Urban Area	domestic	6.8	6.8 - 7.5	7.0	266	214 - 295	252	18.5	17.8 - 22.6	19.1
Vina South	Durham Dayton	agricultural	7.2	6.7 - 7.7	7.4	343	259 - 358	321	18.1	17.4 - 21.8	18.9
Vina South	Esquon	agricultural	7.1	6.9 - 7.6	7.2	545	388 - 557	465	18.3	18.0 - 21.4	19.3
Butte	Llano Seco	domestic	7.9	7.0 - 8.2	7.9	183	179 - 240	194	20.0	19.9 - 23.5	20.6
Vina South	M & T	agricultural	7.4	6.9 - 7.9	7.6	385	333 - 678	467	17.7	17.1 - 19.2	17.9
Vina South	Pentz	domestic	7.1	6.7 - 7.8	7.3	214	204 - 231	217	22.2	21.2 - 23.9	21.9
Wyandotte Creek Oroville	Thermalito	domestic	7.4	6.5 - 8.0	7.3	249	132 - 306	184	18.1	17.1 - 18.9	17.7
Wyandotte Creek Oroville	Thermalito domestic	domestic	7.6	6.9 - 7.8	7.6	324	320 - 374	343	20.2	19.4 - 22.6	20.1
Vina North	Vina	domestic	7.5	6.2 - 8.0	7.4	188	174 - 225	197	20.0	18.8 - 22.8	19.8
Butte	Western Canal (east)	agricultural	6.9	6.5 - 7.3	7.0	448	344 - 524	449	19.0	18.2 - 20.5	19
Butte	Western Canal (west)	agricultural	7.7	6.6 - 8.1	7.5	425	248 - 695	479	19.0	18.1 - 21.8	19.5

Source: Butte County, 2020, Groundwater Status Report Appendix D.

5. Emerging Issues

During the past five years, Butte County's population decreased by almost 12,000 residents, due in part to the 2018 Camp Fire and 2020 North Complex Fire. However, continuing statewide population growth will require additional water to meet demand, with much of the new demand originating in water-poor southern California.

Changes in water management have resulted in increased environmental water use. In past decades, the Bay-Delta Accord, Central Valley Project Improvement Act, and implementation of CALFED dedicated more water for environmental purposes, which may have affected water supply availability to agricultural and urban water users. The State Water Resources Control Board (State Board) has initiated hearings to update the Bay-Delta Water Quality Control Plan. As part of the draft plan, the State Board may require unimpaired flows into the Delta. Water right holders in Butte County and the Sacramento Valley may lose a portion of their water rights. The result would increase the groundwater demand from lost surface water.

a. Northern – Southern California Water Resource Issues

In the northern portion of the state, there is general consensus that, while the chronic environmental and water resources problems in the Bay-Delta and southern California need to be resolved, their resolution should not limit the ability of the northern counties to meet their present and future land use and water resource needs.

b. Emerging Groundwater Issues

Drought, sustainable groundwater management, groundwater quality, and lack of centralized water delivery systems in certain rural parts of the county are among the most important water resources issues to be dealt with in the future.

i. Drought

The 2012 to 2016 drought was notable due in part to a reduction in surface water supply and precipitation, as well as spring snowmelt. Reduced precipitation in the valley led to increased irrigation demands. Cutbacks and curtailments to surface water supplies led to increased demand for groundwater to meet crop irrigation requirements.

As the largest drought of recent history, the 1987-1994 drought was notable for its six-year duration and its statewide impacts. During the drought, the State Water Project terminated deliveries to agricultural contractors and provided only 30 percent of the total urban deliveries. Governor's Executive Order No. W-3-91 created a Drought Action Team and directed the DWR to implement a drought water bank.

Some land owners within the Butte Basin area, including agricultural water districts, sold surface water entitlement to the State Water Bank on a temporary basis, and increased groundwater pumping to make up the difference. Some farmers in the county contended that increased pumping of groundwater lowered the water table and adversely affected their wells or significantly increased pumping costs.

Several factors have emerged that would increase the level of impact under similar climatic conditions to those experienced during the 1987 to 1994 drought. California's population has increased substantially since the last drought and is expected to continue to increase. The State water management framework has significantly changed, with reduced allocation of Colorado River water and environmental concerns in the Sacramento-San Joaquin River Delta and San Francisco Bay.

ii. Groundwater Development

Though the majority of the county's foothill population is served with surface water in the Paradise area, groundwater development in the fractured hard rocks in the foothills of the southern Cascades and Sierra Nevada is fraught with uncertainty. Groundwater supplies from fractured rock sources are highly variable in terms of quantity and quality and are an uncertain source for large-scale residential uses. The infrastructure necessary to transport surface supplies to many of the county's small, remote communities is not in place. Historically, foothill development relied on water supply from springs and river diversions with flumes and ditches for conveyance, but as of 2016, most development uses individual private wells. As pressures for larger scale development increase, questions about the reliability of supply needs to be addressed. Also, potential development of regional water supply projects is complicated by the area's geographically dispersed development patterns, which do not provide the financial capacity to support such projects.

Drawdown of groundwater has been identified as a potential concern for the Vina sub-basin, and residents of other parts of the county have had to increase the depth of their wells. Other locations suffer from degraded groundwater quality due to contamination from nitrates and organics.

iii. Groundwater Quality

The primary water quality concerns in the county involve release of improperly treated waste to freshwaters, including mountain and foothill rivers and streams, and lowland fresh waters. Waste discharge requires treatment for suspended and settleable solids, biological degradable organic substances, bio-stimulatory nutrients, toxic substances, and chloroform organisms to maintain the existing water quality control conditions, or to avoid bio-stimulation of surface waters. Water reclamation and planning for irrigation and other uses of water is important in the lowland areas where most county water is used.

An adequate supply of water of a quality suitable for all uses requires water quality management. Pollution abatement, waste treatment, efficient use of water, recycling of industrial water for reuse, and reservoir release to increase low stream flows are widely-used management techniques. Water quality management will receive increased attention in the future plans of water development.

6. Pollutants of Concern

Coliform bacteria, solvents, and salts have contributed to water quality problems in the county. In the past, in the Chico area and in the Town of Paradise area, there have been excessive levels of coliform bacteria or nitrates entering the groundwater. Failed septic systems, or too many septic systems in a concentrated area, have been identified as probable causes. Surface water quality is also at risk from potential chemical spills, such as occurred in 1991 as a result of a train derailment on the upper Sacramento River.

In addition, a number of chemicals are known to be released from hazardous waste sites within the county. In Butte County there are 13 active hazardous waste and substances sites which are monitored by the Department of Toxic Substances Control (DTSC) and identified in the DTSC's Cortese list. A majority of these sites are reported to contribute to groundwater contamination, especially in the Chico area.

There are three large groundwater contamination plumes in Butte County, the Central Plume, the Skyway Subdivision Groundwater Plume, and the Southwest Plume. High concentrations of perchloroethylene (PCE) in the Central Plume caused two wells to be abandoned by the California Water Service Company in 1990. In the Southwest Plume, tetrachloroehylene (TCE) was found, a pollutant that causes nervous system depression, liver and kidney damage, among other effects. In 2003, both PCE and TCE were found at the Skyways Subdivision Groundwater Plume, whose maximum width is still unknown. Other groundwater contaminants in Butte County include arsenic, chromium, copper, dioxin, and polynuclear aromatic hydrocarbons. For a more complete discussion of hazardous waste sites and substances in Butte County, refer to Chapter 17, Hazards and Safety.

IV. WATER SUPPLY AND DEMAND

Historic and present-day water demand is presented in this section to provide baseline water balance information, inform policymakers, and provide a basis for forward projection of supply and demand. The results of this analysis will provide a viable basis for planning. The analysis will also support the dissemination of information and the development of consensus among county stakeholders.

1. Existing Supply and Demand

In 2016, the County updated its comprehensive inventory of its water resources and evaluated its overall water supply and demand. In 2018-2020, additional work to support Groundwater Sustainability Plan development in the three Butte County subbasins (Vina, Butte, and Wyandotte Creek) developed estimates of water supply and demand for each subbasin. This information can be found in each respective Groundwater Sustainability Plan, which will be adopted by January 2022. The trends described in the 2016 County report remain relevant to current conditions.

The 2016 Butte County Water Inventory and Analysis report provided an estimate of water supply and demand for the major water users in the county: irrigated lands and wetlands, developed lands, and non-irrigated lands. Following is a summary of the analysis as presented in the 2016 report.

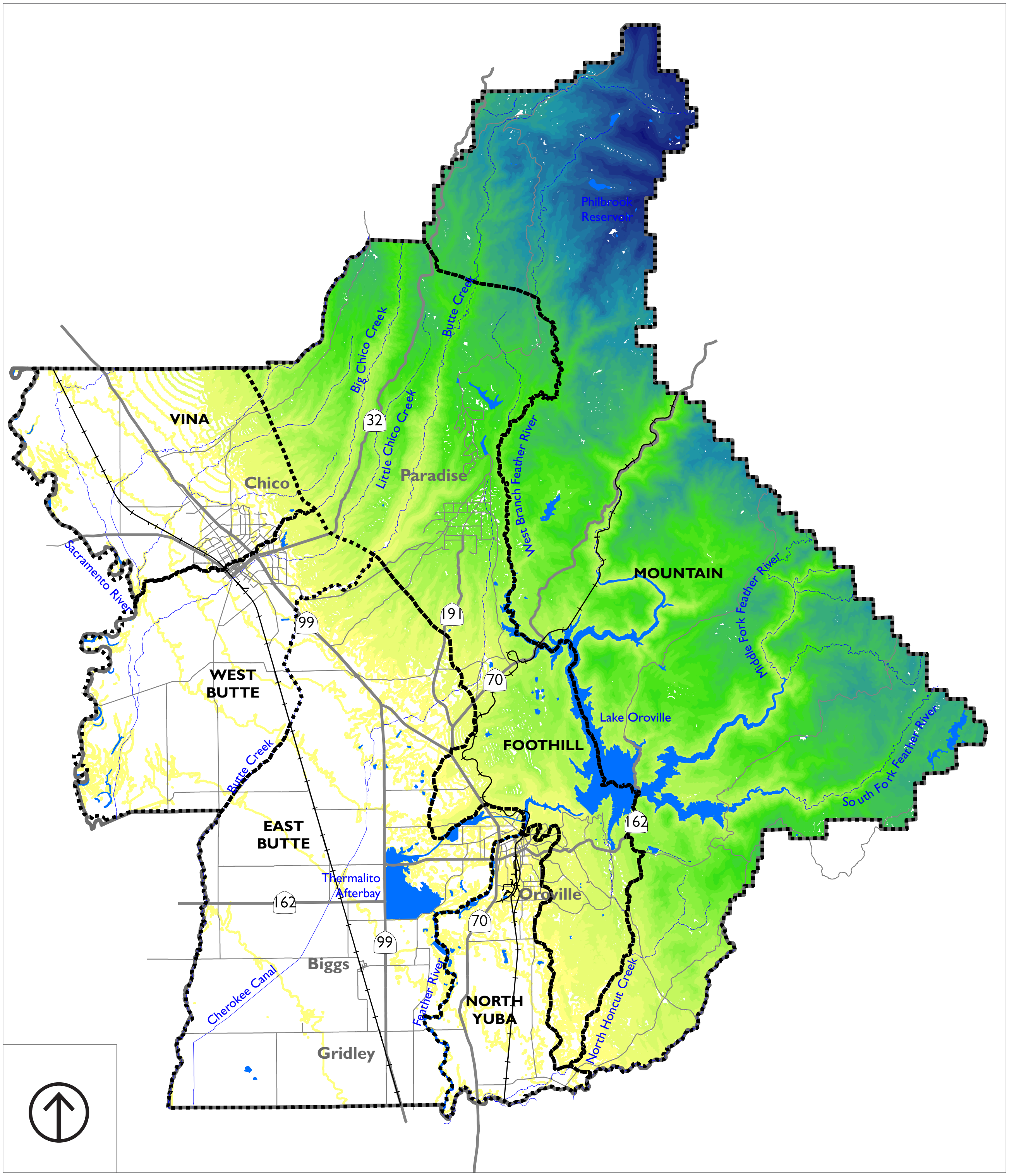
For purposes of the analysis, the county was divided into six water inventory units; Vina, West Butte, East Butte, North Yuba, Foothill, and Mountain; based on hydrologic basins and water sources. The six units are mapped in Figure 12-11. Existing water demand and supplies, measured between 2000 and 2014, were assessed for each sub-unit. Table 12-9 lists the inventory units and water suppliers within inventory unit boundaries.

Foothill and Mountain Inventory Units (IUs), for which primary demands are urban uses, were not analyzed in the 2016 report. Water supplies in the Foothill and Mountain IUs include surface water diversions by Paradise Irrigation District (PID) and groundwater pumping from fractured rock aquifers.

In the Foothill IU, surface water deliveries by PID have totaled approximately 7.5 TAF annually, on average between 2000 and 2014. Remaining water supplies in the Foothill IU include pumping of an estimated 2.8 TAF annually by Del Oro Water Company and 6.7 TAF annually by others based on population and per-capita water use estimates. Estimated private domestic pumping in the Mountain IU is 1.9 TAF annually based on population and per-capita water use estimates.

Table 12-10 provides a summary of the estimated water supply and demand presented in the Water Inventory & Analysis Report for the 2000 to 2014 average, including precipitation, surface water, groundwater, evapotranspiration, deep percolation runoff, and return flow. Variability in precipitation and available surface water supplies from year to year illustrate conditions in wet versus dry years. In extreme dry years, curtailment of approximately 50 percent of Feather River supplies from Lake Oroville (the primary surface water supply in the County) can occur; however, such conditions did not occur during the 2000 to 2014 period. This most recently occurred in 2015. Key findings of the report include the following:

- Approximately 95 percent of developed water use is for irrigated agriculture and managed wetlands, with the remaining 5 percent for developed lands.
- Almost all irrigated agriculture and managed wetlands water use and the majority of developed water use occurs on the valley floor; however, surface water and groundwater supplies are critical to Foothill and Mountain IU populations.
- Supplies are distributed throughout the county in the same pattern as demands, with the most water going to the West Butte inventory unit (62 percent), followed by East Butte (21 percent), Vina (11 percent), and North Yuba (6 percent).
- On average, there is no water supply shortfall.



Source: PlaceWorks, Butte County General Plan 2030 Setting & Trends Report, 2007.

Figure 12-11
Water Inventory Units

TABLE 12-9 INVENTORY UNITS AND WATER SUPPLIERS

Inventory Units	Water Suppliers
East Butte	Biggs-West Gridley Water District
	Butte Water District
	City of Biggs
	City of Gridley
	Durham Mutual Water District
	Richvale Irrigation District
	Thermalito Water and Sewer District
	Western Canal Water District
Foothill	Paradise Irrigation District
	Del Oro Water Company
	South Feather Water & Power Agency
Mountain	N/A
North Yuba	California Water Service, Oroville
Vina	California Water Service, Chico
West Butte	California Water Service, Chico
	Dayton Mutual Water District
	Durham Irrigation District
	Western Canal Water District

Source: Butte County, Water Inventory & Analysis Report, 2016.

TABLE 12-10 AVERAGE TOTAL INFLOWS (SUPPLY) / OUTFLOWS (DEMAND) BY INVENTORY UNIT AND LAND TYPE

	Vina	West Butte	East Butte	North Yuba
Irrigated Lands and Wetlands	170 / 171	987 / 987	336 / 336	94 / 93
Developed Lands	48 / 49	38 / 39	29 / 28	25 / 25
Non-Irrigated Lands	78 / 78	141 / 142	43 / 43	51 / 50

Source: Butte County, Water Inventory & Analysis Report, 2016.

2. Water Demand and Supply by User

a. Irrigated Lands and Wetlands

In the 2016 *Water Inventory and Analysis*, irrigated agriculture and wetland inflows on the Butte County Valley Floor average approximately 1.59 MAF annually and include precipitation (504 TAG), groundwater pumping (374 TAF), and applied surface water (709 TAF). Between 2007 and 2011, precipitation, groundwater pumping, and applied surface water varied by approximately 450, 150, and 140 TAF, respectively.

Applied surface water was nearly constant between 2000 and 2014, with greater variability in groundwater pumping. In general, pumping increases in dry years due to increased irrigation requirements resulting from decreased precipitation. With respect to outflows, total evapotranspiration is relatively steady over time, with variability in deep percolation and surface water runoff varying largely in proportion to annual precipitation.

b. Developed Lands

Inflows to developed lands on the Butte County Valley Floor averaged approximately 140 TAF annually and include precipitation (98 TAF), groundwater pumping (36 TAF), and applied surface water (6 TAF). Precipitation varied by approximately 87 TAF between 2007 and 2011. Groundwater pumping has been relatively consistent over time, varying by 7 TAF annually, with an average estimated pumping of 31 TAF by water suppliers and 5 TAF by rural residential pumpers, according to the 2015 Urban Water Management Plan.

Groundwater pumping was steady between 2000 and 2014. Pumping for developed lands remains relatively constant resulting from insensitivity of indoor water demands to precipitation and less sensitivity of outdoor water use (irrigation) to precipitation than for irrigated agriculture.

Regarding outflows, total evapotranspiration is relatively constant, with changes in deep percolation and surface water runoff occurring largely proportional to annual precipitation. A portion of runoff and return flow from developed lands returns to the groundwater system through septic systems and stormwater retention while other runoff and return flow enters local waterways. Additional analysis will be needed to refine estimates of the relative proportion of non-consumed water use on developed lands returning to surface water systems rather than the groundwater system.

A. Future Water Supply and Demand

The 2016 Water Inventory & Analysis presents several projections concerning future water use. Various methods are used in the report to project or forecast demands, the key aspects of which are described below.

1. Urban

Butte County's urban water needs will certainly increase in the future since the Butte County Association of Governments projects increases in population for all the incorporated cities and towns, as well as for the unincorporated county. Projections for urban water use are presented in Table 12-11. Overall, the City of Chico is expected to see the greatest increase in water demand, up 108 percent between 2015 and 2030. Paradise shows the next highest increase, at 82.5 percent, followed by Oroville and then Biggs.

2. Agriculture

Over the past couple of decades, a relatively constant reduction in field, truck, and pasture crops in Butte County has been observed. Those crops have been replaced by orchards, primarily walnuts. Replacement of older orchards and advances in farming practices, like irrigation technology (application uniformity), and management (irrigation scheduling), will lead to increases in irrigation efficiency and evapotranspiration, along with crop yields.

TABLE 12-11 PROJECTED ANNUAL URBAN WATER DEMANDS

	2015 Demand (Acre-Feet)	Increase in Urban Demand (%)	2040 Estimated Urban Demand (Acre-Feet)
Biggs*	684	34.8	922
Chico	18,227	108	37,974
Gridley*	1,761	28.2	2,259
Oroville	2,322	54.8	3,595
Paradise	4,282	82.5	7,817
Unincorporated Areas*	27,524	13.3	31,179
Total	**67,400**		**91,100**

* Calculated based on projected growth rates from 2000.
Source: Butte County 2006 Integrated Water Resources Plan, 2015 Urban Water Management Plans of Paradise Irrigation District, CalWater Chico, and CalWater Oroville.

B. Water Conservation

Water conservation provides a significant opportunity to safeguard valuable surface and groundwater resources by limiting demand on those sources through wise water use practices.

1. Water Conservation Best Management Practices

A Memorandum of Understanding Regarding Urban Water conservation in California provided the basis for the demand management measures in the Urban Water Management Planning Act and in forecasts of future urban demands. Del Oro Water Company and California Water Service are signatory to the MOU regarding urban water conservation in California. The MOU formed the California Water-Efficiency Partnership, which has implemented Urban BMPs in the state.

Urban Best Management Practices (BMPs) have been identified for use in Urban Water Management Plans, and include the following:

- Water survey programs for single-family and multi-family residential customers;
- Residential plumbing retrofit;
- System water audits, leak detection, and repair;

- Metering with commodity rates for all new connections and retrofit of existing connections;
- Large landscape conservation programs and incentives;
- High-efficiency washing machine rebate programs;
- Public information programs;
- School education programs;
- Conservation programs for commercial, industrial, and institutional accounts;
- Wholesale agency assistance programs;
- Conservation pricing;
- Conservation coordinator;
- Water waste prohibition; and
- Residential Underground Leaking Fuel Tank replacement programs.

In Butte County, conservation practices such as the following are in effect:

- Conservation requirements for plumbing in new construction;
- Public information programs about water conservation; and
- Water audits; and Leak detection and repair.

2. Water Recycling

Water recycling is a potential source of supply for groundwater recharge. The amount of treated effluent generated in Butte County is small compared to the overall water supply. Consequently, there is little need for much analysis in this area, but it could become more important in the future as the number of sewer connections increases.

3. Water Pricing

Water pricing encourages water conservation, recovers environmental costs, or recovers other external costs. Some water districts in Butte County meter their water to charge by the amount used, while others charge a flat rate. Statewide, there are major differences in water pricing, based on different timing of water rights, different infrastructure costs, and varying operation and maintenance costs. Since newer facilities are more expensive, water providers decide between charging the new customers the actual incremental cost through higher connection fees, and combining new costs with the older system costs to be paid by all customers. Drinking water costs at least several hundred dollars per acre-foot. Agricultural water is more variable, ranging from a few dollars per acre-foot to several hundred dollars per acre-foot. One of the biggest challenges in water pricing is how to price water in water contracts.

4. Emergency Conservation Regulations

During and in response to the 2012-2016 drought, the State Water Board adopted emergency conservation regulations to reduce unnecessary water consumption during times of extreme drought. These included the following, with some still in effect today:

- Conducting "stress tests" of public water systems to ensure a three-year water supply under extended drought conditions.
- Prohibiting the application of potable water to any driveway or sidewalk, or any application that causes runoff to adjacent property or non-vegetated areas.
- Requiring the handwashing of vehicles to use hoses with a shut-off nozzle.
- Prohibiting the use of potable water in non-recirculated water features and encouraging recycled water for such decorative uses.
- Implementing water shortage contingency plans to a level where restrictions on outdoor irrigation are mandatory, with certain areas being limited to outdoor irrigation at a frequency of no more than twice a week, or a comparable level of savings.
- Providing water to restauranteurs and the laundering of hotel linens by request only.
- Informing water users of user-addressable leaks.
- Reporting on water usage, compliance, and enforcement

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13 BIOLOGICAL RESOURCES

This chapter of the report provides an overview of biological resources in the Butte County Planning Area (Planning Area). The Planning Area has a variety of habitat types and extensive areas of important habitats for many species of plants and animals. For the purposes of the General Plan update, this Setting and Trends Report summarizes the types of resources known to exist in the Planning Area. This information will guide policy development.

A. *Sources of Information*

The methods used to identify biological resources in the Planning Area included a review of existing resource information related to the Planning Area. The following pertinent sources were reviewed:

- A records search of the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB) for Butte County;[1]
- The U.S. Fish and Wildlife Service (USFWS) list of endangered, threatened, and proposed species for Butte County;[2]
- the California Native Plant Society's (CNPS) 2021 online *Inventory of Rare and Endangered Plants of California;*[3]
- The existing Butte County General Plan;[4] and
- Ecological Baseline Conditions Report for the Butte Regional Habitat Conservation Plan/Natural Community Conservation Plan.[5]

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[1] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

[2] U.S. Fish and Wildlife Service, 2021. IPaC Resource List: Butte County. Available:<https://ecos.fws.gov/ipac/location/I43VP3UJ2JCSTBJQ4PZDFX2FEY/resources>. Accessed: February 3, 2021.

[3] California Native Plant Society, Rare Plant Program, 2021. *Inventory of Rare and Endangered Plants in California.* (Online Edition, Version 8-03 0.39.) Available: <http://www.rareplants.org>. Accessed February 2021. Sacramento, CA: California Native Plant Society.

[4] Butte County, 2012. Butte County General Plan. 2030.

[5] Science Applications International Corporation, 2019. *Ecological Baseline Conditions Report for the Butte Regional Habitat Conservation Plan/Natural Community Conservation Plan.* Prepared for Butte County Association of Governments, Chico, CA.

Information from these sources was used to identify the biological communities and develop lists of special-status plant and wildlife species known to occur, or identified as having the potential to occur, in the Planning Area.

B. Regulatory Setting

This section describes the federal, State, and local plans, policies, and laws relevant to biological resources in the Planning Area.

1. Federal Regulations

a. Federal Endangered Species Act

The Federal Endangered Species Act (ESA) protects fish and wildlife species, and their habitats, that have been identified by the USFWS or National Oceanic & Atmospheric Administration's National Marine Fisheries Service (NMFS) as threatened or endangered. *Endangered* refers to species, subspecies, or distinct population segments that are in danger of extinction through all or a significant portion of their range. *Threatened* refers to species, subspecies, or distinct population segments that are likely to become endangered in the near future.

The ESA is administered by the USFWS and the NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fish, whereas other listed species are under USFWS jurisdiction. Provisions of ESA Sections 7 and 9 are relevant to the General Plan update and are summarized below.

i. Endangered Species Act Authorization Process for Federal Actions (Section 7)

Section 7 of the ESA provides a means for authorizing *take* of threatened and endangered species by federal agencies. Under Section 7, the federal agency conducting, funding, or permitting an action (the lead federal agency, such as the U.S. Army Corps of Engineers [Corps]) must consult with USFWS or NMFS, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed project "may affect" a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the expected effect. In response, USFWS or NMFS issues a biological opinion, with a determination that the proposed action either:

- May jeopardize the continued existence of one or more listed species (*jeopardy finding*) or result in the destruction or adverse modification of critical habitat (*adverse modification finding*), or

- Will not jeopardize the continued existence of any listed species (*no jeopardy finding*) or result in adverse modification of critical habitat (*no adverse modification finding*).

The biological opinion issued by the USFWS or NMFS may stipulate discretionary "reasonable and prudent" conservation measures. If the project would not jeopardize a listed species, the USFWS or NMFS issues an incidental take statement to authorize the proposed activity.

ii. Endangered Species Act Prohibitions (Section 9)

Section 9 of the ESA prohibits the take of any fish or wildlife species listed under the ESA as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by federal regulations. In some cases, exceptions may be made for threatened species under ESA Section 4[d]; in such cases, the USFWS or NMFS issues a "4[d] rule" describing protections for the threatened species and specifying the circumstances under which take is allowed. *Take*, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." In addition, Section 9 prohibits removing, digging up, cutting, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction.

iii. Section 10

When no discretionary action is being taken by a federal agency but a project may result in the take of listed species, an incidental take permit under Section 10 of the ESA is necessary. The purpose of the incidental take permit is to authorize the take of federally listed species that may result from an otherwise lawful activity, not to authorize the activities themselves. To obtain an incidental take permit, an application must be submitted that includes a Habitat Conservation Plan (HCP). The purpose of the HCP planning process is to ensure that adequate minimization and mitigation for impacts to listed species and/or their habitat will occur.

iv. Critical Habitat

For the purpose of designating Critical Habitat, habitat is defined as the abiotic and biotic setting that currently or periodically contains the resources and conditions necessary to support one or more life processes of a species. Critical Habitat designations identify, to the extent known and using the best scientific data available, physical or biological features essential to the conservation of the species. These include features that occur in specific areas and that are essential to support the life-history needs of the species, including but not limited to water characteristics, soil type, geological features, sites, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions (i.e., conditions that are temporary, short-term, and/or changing). Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

b. Magnuson-Stevens Fishery Conservation and Management Act

The 1996 Magnuson-Stevens Fishery Conservation and Management Act, as amended (16 USC 1801), requires federal agencies to consult with NMFS whenever a proposed action has a potential to adversely affect Essential Fish Habitat (EFH). Although states are not required to consult with NMFS, NMFS is required to develop EFH conservation recommendations for any State agency activities with the potential to affect EFH. EFH is defined as "…those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity" and includes the necessary habitat for managed fish to complete their life cycles and contribute to a sustainable fishery and healthy ecosystem. Although the concept of EFH is like the ESA definition of Critical Habitat, measures recommended by NMFS or a regional fisheries management council to protect EFH are advisory, rather than prescriptive (NMFS 1998).[6]

c. Clean Water Act

The federal Clean Water Act (CWA) was enacted as an amendment to the federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

The CWA empowers the Environmental Protection Agency (EPA) to set national water quality standards and effluent limitations and includes programs addressing both point-source and nonpoint-source pollution. Point-source pollution is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. Nonpoint-source pollution originates over a broader area and includes urban contaminants in

[6] National Marine Fisheries Service (NMFS). 1998. Essential fish habitat: new marine fish habitat conservation mandate for federal agencies. EFH Federal Agency Primer 12/98. Northeast Region, Gloucester, MA.

stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following sections provide additional details on specific sections of the CWA.

i. Permits for Fill Placement in Waters and Wetlands (Section 404)

CWA 404 regulates the discharge of dredged and fill materials into waters of the United States. Waters of the United States refers to oceans, bays, rivers, streams, lakes, ponds, and wetlands. On June 22, 2020, the EPA and the Department of the Army published the Navigable Waters Protection Rule to define "Waters of the United States."[7] The agencies streamlined the definition into four categories of jurisdictional waters, provided clear exclusions for many water features that traditionally have not been regulated, and defined terms in the regulatory text that have never been defined before.

The Navigable Waters Protection Rule regulates traditional navigable waters (TNW) and the core tributary systems that provide perennial or intermittent flow into them.

The four categories of federally regulated waters are:

- The territorial seas and TNW;
- Perennial and intermittent tributaries to those waters;
- Certain lakes, ponds, and impoundments; and
- Wetlands adjacent to jurisdictional waters.

Applicants must obtain a permit from the Corps for all discharges of dredged or fill material into waters of the United States, including adjacent wetlands, before proceeding with a proposed activity. The Corps may issue either an individual permit evaluated on a case-by-case basis or a general permit evaluated at a program level for a series of related activities. General permits are preauthorized and are issued to cover multiple instances of similar activities expected to cause only minimal adverse environmental effects. Nationwide permits (NWPs) are a type of general permit issued to cover particular fill activities. Each NWP specifies particular conditions that must be met for the NWP to apply to a particular project.

[7] 85 Federal Register 22250-22342, April 21, 2020.

Potential waters of the United States in the Planning Area would be under the jurisdiction of the Sacramento District of the Corps.

Compliance with CWA 404 requires compliance with several other environmental laws and regulations. The Corps cannot issue an individual permit or verify the use of a general permit until the requirements of the National Environmental Policy Act (NEPA), ESA, and NHPA have been met. In addition, the Corps cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued pursuant to CWA 401.

ii. Permits for Stormwater Discharge (Section 402)

CWA 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by the EPA. In California, the State Water Resources Control Board is authorized by the EPA to oversee the NPDES program through the Regional Water Quality Control Boards (RWQCBs) (see the related discussion under "Porter-Cologne Water Quality Control Act" below). The Planning Area is under the jurisdiction of the Central Valley RWQCB.

NPDES permits are required for projects that disturb more than 1 acre of land. The NPDES permitting process requires the project applicant to file a public notice of intent (NOI) to discharge stormwater and prepare and implement a stormwater pollution prevention plan (SWPPP). The SWPPP includes a site map and a description of proposed construction activities. In addition, it describes the best management practices (BMPs) that will be implemented to prevent soil erosion and discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, and cement) that could contaminate nearby water resources. Permittees are required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants.

iii. Water Quality Certification (Section 401)

Under CWA 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect State water quality (including projects that require federal agency approval, such as issuance of a CWA 404 permit) also must comply with CWA Section 401. In California, the State

Water Resources Control Board (SWRCB) is authorized to issue CWA 401 water quality certification through the RWQCB. If the Corps determines a wetland is not subject to regulation under CWA 404, CWA 401 water quality certification is not required. However, the RWQCB may impose waste discharge requirements (WDRs) if fill material is placed into Waters of the state (see the related discussion under "Porter-Cologne Water Quality Control Act" below).

d. Executive Order 13186 (Federal Migratory Bird Treaty Act)

The Migratory Bird Treaty Act (MBTA) (16 U.S. Government Code 703–711) implements international treaties between the US and other nations devised to protect migratory birds, any of their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. As authorized by the MBTA, the USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (i.e., rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits can be found in 50 CFR part 13 General Permit Procedures and 50 CFR part 21 Migratory Bird Permits. The State of California has incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the California Fish and Game Code.

2. State Regulations

a. California Environmental Quality Act

CEQA is the regulatory framework by which California public agencies identify and mitigate significant environmental impacts. A project normally is considered to result in a significant environmental impact on biological resources if it substantially affects a rare or endangered species or the habitat of that species, substantially interferes with the movement of resident or migratory fish or wildlife, or substantially diminishes habitat for fish, wildlife, or plants, including sensitive natural communities as defined by CDFW.[8] The State CEQA Guidelines define rare, threatened, or endangered species as those listed under the California Endangered Species Act (CESA) and ESA, as well as any other species that meets the criteria of the resource agencies or local agencies (e.g., the CDFW-designated "species of special concern" and CNPS-listed species). The effects of a proposed

[8] California Department of Fish and Wildlife, 2021. *Natural Communities*. Available: <https://wildlife.ca.gov/Data/VegCAMP/Natural-Communities>. Accessed February 11, 2021.

project on these resources are important in determining whether the project has significant environmental impacts under CEQA.

b. California Endangered Species Act

California enacted CESA in 1984. The act prohibits the take of endangered and threatened species; however, habitat destruction is not included in the State's definition of take. Under CESA, take is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include harm or harassment. Section 2090 of CESA requires State agencies to comply with endangered-species protection and recovery and promote conservation of these species. The CDFW administers the act and authorizes take through Section 2081 agreements (except for species designated as fully protected). Regarding rare plant species, CESA defers to the California Native Plant Protection Act of 1977, which prohibits importing rare and endangered plants into California, taking rare and endangered plants, and selling rare and endangered plants. State-listed plants are protected mainly in cases where State agencies are involved in projects under CEQA. In these cases, plants listed as rare under the California Native Plant Protection Act are not protected under CESA but can be protected under CEQA. Federally and state-listed species in the Planning Area are described in Section C, Existing Conditions.

c. Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Act, the RWQCB regulates actions that would involve "discharging waste, or proposing to discharge waste, within any region that could affect the water of the state" (Water Code 13260(a)). Waters of the state are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code 13050 (e)). The RWQCB regulates all such activities, as well as dredging, filling, or discharging materials into Waters of the state, that are not regulated by the Corps due to a lack of connectivity with a navigable water body. The RWQCB may require issuance of WDRs for these activities. Although all waters of the United States that are within the borders of California are also waters of the state, the converse is not true (i.e., in California, waters of the United States represent a subset of waters of the state). Thus, California retains authority to regulate discharges of waste into any waters of the state, regardless of whether the Corps has concurrent jurisdiction under CWA 404.

d. California Fish and Game Code

i. Section 1602

Under Section 1602 of the California Fish and Game Code, project proponents are required to notify CDFW before undertaking any project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review occur generally during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, CDFW is required to propose reasonable project changes to protect the resources. These modifications are formalized in a streambed alteration agreement that becomes part of the plans, specifications, and bid documents for the project.

ii. Sections 3503, 3503.5, 3511, 3513, 5515, 5050, and 4700 (Fully Protected Species)

The California Fish and Game Code provides protection from take for a variety of species referred to as fully protected species. Section 5050 lists protected amphibians and reptiles. Section 5515 prohibits take of fully protected fish species. Section 3511 prohibits take of fully protected bird species. Section 4700 prohibits take of fully protected mammals. The California Fish and Game Code defines take as "hunt, pursue, catch, capture, or kill or attempt to hunt, pursue, catch, capture, or kill." All take of fully protected species is prohibited, except for take related to scientific research and take associated with an approved conservation plan that covers a fully protected species. Section 3503 prohibits the killing of birds or the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and the destruction of raptor nests. The nests of the many bird species that could nest in the Planning Area would be protected under these sections of the California Fish and Game Code.

e. California Oak Woodlands Conservation Act

The California Oak Woodlands Conservation Act was enacted in 2001 to protect oak woodland habitats that were being diminished due to development, firewood harvesting, and agricultural conversions. The Oak Woodlands Conservation Program was established to provide funding opportunities for private landowners, conservation organizations, and cities and counties to conserve and restore oak woodlands. The program authorizes the Wildlife Conservation Board to purchase oak woodland conservation easements and provide grants for land improvements and oak restoration efforts.

3. Regional and County Regulations

a. Oak Woodlands Management Plan Resolution

In 2007, the Butte County adopted the Oak Woodlands Management Plan Resolution, which is intended to provide incentive-based, voluntary opportunities to private landowners who wish to pursue oak woodland conservation strategies as provided by the 2001 California Oak Woodlands Conservation Act. This resolution adopts the 2006 Oak Woodland Resources Assessment Report, developed by the Butte County Resource Conservation District, as the Butte County Oak Woodlands Management Plan (Management Plan). Through the Management Plan, the County acknowledges the values associated with oak woodlands, and recognizes and supports private landowners who choose to voluntarily adopt measures to ensure oak woodland viability through participation in the Oak Woodlands Conservation Program. The Management Plan also accepts individual grant applications and provides review by the Butte County Board of Supervisors before submitting them to the Wildlife Conservation Board (WCB).

b. Butte Regional Conservation Plan

The Butte Regional Conservation Plan (BRCP) is a federal HCP and a State Natural Community Conservation Plan (NCCP) that is being coordinated by multiple local agencies through the Butte County Association of Governments (BCAG). The final BRCP was submitted to USFWS, NMFS, and CDFW in 2019 for final review and publication in the Federal Register. Once adopted, the BRCP will provide streamlined State and federal ESA and wetlands permitting for covered activities such as transportation and land development projects. The BRCP-Covered Species include 38 species of wildlife, fish, and plants. Development of a final Regional General Permit, an In-Lieu-Fee program, and streamlined permitting processes for Section 404 permits is underway. In the future, the BCAG hopes to develop and implement streamlining processes for Section 401 of the CWA, Section 1600 of the CDFW Code, and Section 106 of the NHPA.

C. Existing Conditions

Butte County is approximately 1,680 square miles in area and is in the central portion of northern California. Butte County has a high diversity of biological communities because it extends from the Sacramento Valley floor at an elevational range of approximately 50 feet above sea level to the Sierra Nevada at an elevational range of more than 8,000 feet above sea level. The county includes five different geographic subregions: the Sacramento Valley in the western Planning Area, the Cascade Range foothills in the north-central Planning Area, the northern Sierra Nevada foothills in the south-central Planning Area, the high Cascade Range in the northeastern Planning Area, and the northern high Sierra Nevada in the southeastern Planning Area.[9] Biological communities in the Sacramento Valley portion of the Planning Area have been substantially altered since the mid-1800s, when the area was first hydraulically mined, then dredged for gold, and then developed for agriculture.

1. Biological Communities

Based on a review of the existing Butte County General Plan,[10] the Ecological Baseline Conditions Report for the BRCP,[11] the National Vegetation Classification System and its California expression, the Manual of California Vegetation,[12] and A Guide to Wildlife Habitats of California,[13] 10 general types of biological communities occur in the Planning Area. These 10 communities are conifer forest, oak woodland, riparian woodland, chaparral, annual grassland, open water (including reservoirs, ponds, and drainages), wetlands (including perennial and seasonal wetland types, such as freshwater marsh, wet meadow, and vernal pool), agricultural land, barren land, and urban areas. The distribution of general biological community types in the Planning Area is closely associated with the varying topography and hydrology of the geographic subregions. Much of the Sacramento Valley subregion supports agricultural land, annual grassland, and wetlands, while the higher elevation foothills subregions are primarily grassland, oak woodland, and chaparral communities. The highest elevations in the Cascade Range and Sierra Nevada are conifer forest and chaparral communities. Drainages and open water occur within all subregions. Most stream corridors support riparian woodland communities, although these are not specifically shown on the vegetation communities map (Figure 13-1) due to their relatively small scale. A

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[9] Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. *The Jepson Manual; Vascular Plants of California, Second Edition*. University of California Press, Berkeley, California.

[10] Butte County, 2012. Butte County General Plan, Conservation and Open Space Element.

[11] Science Applications International Corporation, 2019. *Ecological Baseline Conditions Report for the Butte Regional Habitat Conservation Plan/Natural Community Conservation Plan*. Prepared for Butte County Association of Governments, Chico, CA.

[12] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento. 1300 pp.

[13] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

discussion of each biological community type, including associated common and federally or state-listed plant and wildlife species, is provided below. Federally or state-listed plant and wildlife species with potential to occur in the Planning Area are listed in Table 13-1. Other special-status species that may occur in each community type are listed in Tables 13-2 and 13-3.

Recently, large fires have burned nearly one-quarter of the acreage within Butte County. The 2018 Camp Fire burned a total of 153,336 acres in Butte County and the 2020 North Complex Fire burned a total of 318,935 acres, approximately half of which were in Butte County. Both the Camp Fire and the Butte County portion of the North Complex Fire burned mostly conifer forest habitat. These fires will impact the vegetation communities for many years and for some have led to changes in the dominant species and/or age classes that were there before the fires. Vegetation communities burned at a high intensity will require active restoration and time to fully recover from the effects of the fire.

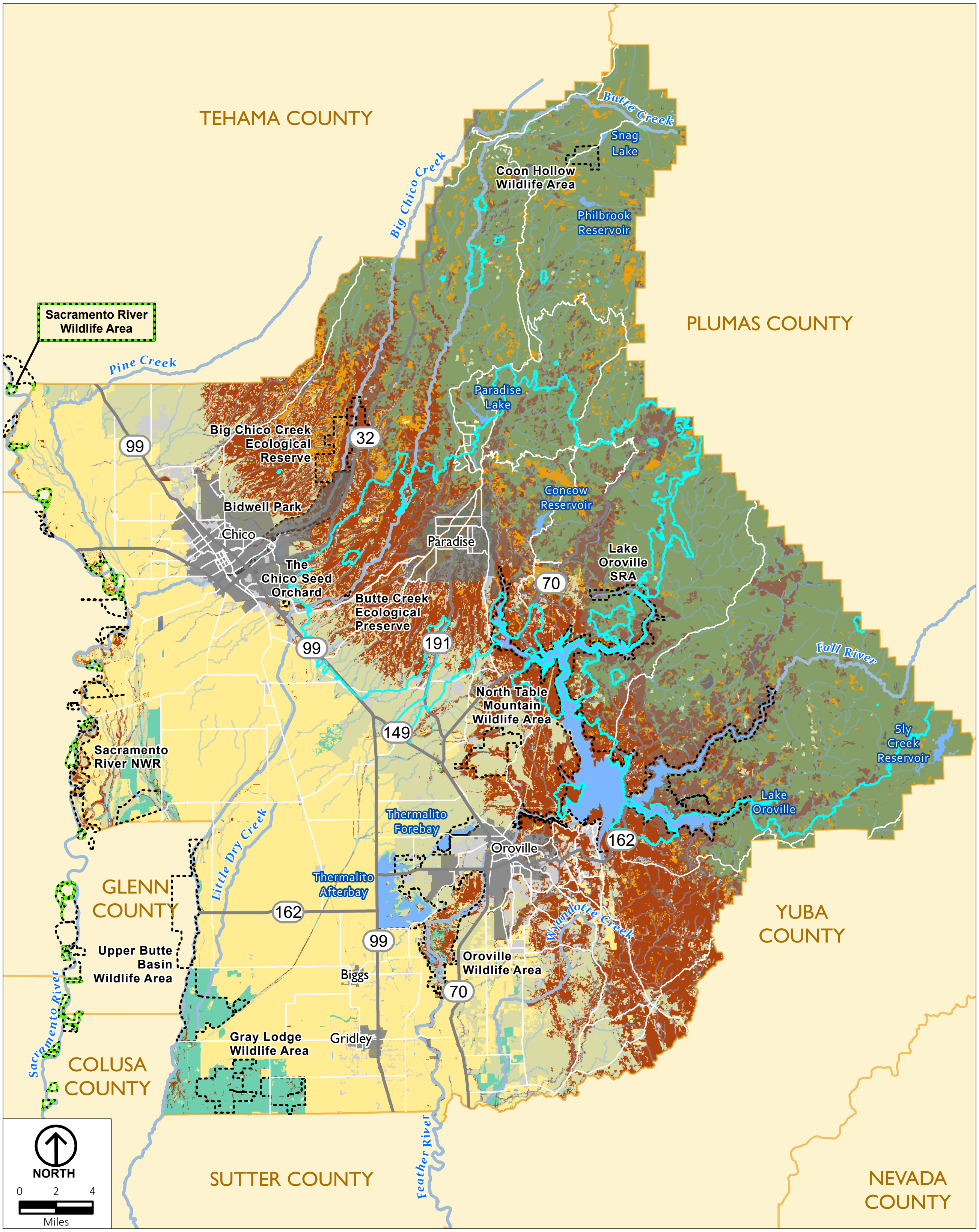
a. Conifer Forest

Several types of conifer forest occur in the Planning Area, including montane hardwood-conifer, ponderosa pine (*Pinus ponderosa*), Sierran mixed conifer, red fir (*Abies magnifica* var. *magnifica*), and subalpine conifer. These forest types are dominated by conifers but vary in the dominant species and elevations at which they occur.

The montane hardwood-conifer forest type occurs at lower elevations below 4,000 feet. In this forest type, California black oak (*Quercus kelloggii*), bigleaf maple (*Acer macrophyllum*), white alder (*Alnus rhombifolia*), and dogwood (*Cornus* sp.) occur with conifers such as Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*), incense-cedar (*Calocedrus decurrens*), and ponderosa pine. This forest type generally has little understory except in areas of disturbance.

Ponderosa pine forests generally occur at elevations below 7,000 feet and include stands of pure ponderosa pine as well as areas with associate species, such as Douglas-fir, sugar pine (*Pinus lambertiana*), white fir (*Abies concolor*), incense-cedar, Jeffrey pine (*Pinus jeffreyi*), and others. Stands also may include a shrub and herbaceous layer.

Sierran mixed conifer occurs in areas of greater precipitation than ponderosa pine forest. Sierran mixed conifer is a multilayered forest type at middle elevations in the northern Sierra that includes conifers such as white fir, Douglas-fir, ponderosa pine, sugar pine, and incense-cedar with California black oak. Many species of shrubs, grasses, and forbs occur in the understory of this forest type.



Source: CDFFP, CALFIRE, FRAP, CDFW VegCamp, USDA Forest Service Region 5 Remote Sensing Laboratory (RSL) data

Vegetation Community Type

- Incorporated Jurisdictions
- Parks, Preserves, Wildlife Areas
- Streams / Channels
- 2018 and 2020 Fire Perimeters
- Agriculture
- Barren/Other
- Conifer Forest
- Conifer Woodland
- Desert Shrub
- Desert Woodland
- Hardwood Forest
- Hardwood Woodland
- Herbaceous
- Shrub
- Urban
- Water
- Wetland

FIGURE 13-1
VEGETATIVE COMMUNITIES

TABLE 13-1 FEDERAL- AND STATE-LISTED SPECIES WITH POTENTIAL TO OCCUR IN THE PLANNING AREA

Species	Federal Listed[1]	Designated Critical Habitat	State Listed
Hoover's spurge	X	X	
Butte County meadowfoam	X	X	X
Hairy Orcutt grass	X	X	X
Greene's tuctoria	X	X	X
Layne's ragwort	X		X
Conservancy fairy shrimp	X	X	
Vernal pool fairy shrimp	X	X	
Vernal pool tadpole shrimp	X	X	
Valley elderberry longhorn beetle	X		
Cascades frog			C
California tiger salamander[2]	X		
California red-legged frog	X	X	
Sierra Nevada yellow-legged frog	X		X
Giant garter snake	X		X
Bald eagle	D		X
Swainson's hawk			X
California black rail			X
Greater sandhill crane			X
Least Bell's vireo	X		X
Tricolored blackbird			X
Western yellow-billed cuckoo	X	P	X
Willow flycatcher			X
Bank swallow			X
Central Valley steelhead	X		
Central Valley spring-run Chinook salmon	X		
Sacramento River winter-run Chinook salmon	X		X
Green sturgeon		X	
Spring-run Chinook salmon		X	
Steelhead		X	
Sierra Nevada red fox			X
Pacific fisher	X		
California wolverine			X

1. X = listed, C = candidate, P = proposed, D = delisted
2. California tiger salamander is considered extirpated from the County (CDFW 2021)

TABLE 13-2 SPECIAL-STATUS PLANTS DOCUMENTED OR IDENTIFIED AS HAVING THE POTENTIAL TO OCCUR IN THE PLANNING AREA

Common and Scientific Name	Legal Status[a] Federal/State/ CNPS/HCP	Geographic Distribution/ Floristic Province	Habitat Requirements	Blooming Period	Quadrangles with Recorded Occurrences of Species[b] and Habitat in the Planning Area
Henderson's bent grass *Agrostis hendersonii*	–/–/3.2/–	Scattered locations in Central Valley and adjacent foothills with occurrences in Butte, Calaveras, Merced, Placer, Shasta, and Tehama Counties	Moist places in valley and foothill grassland, vernal pools; 70–305 meters (m)	Apr–May	Brush Creek; habitat present in grasslands and vernal pools
Jepson's onion *Allium jepsonii*	–/–/1B.2/–	Sierra Nevada foothills in Butte County; one disjunct population in Tuolumne County	Serpentine or basalt outcrops in cismontane woodland and lower montane coniferous forest; 300–1,160 m	May–Aug	Berry Creek, Paradise East, Pulga; habitat potentially present in oak woodlands
Sanborn's onion *Allium sanbornii* var. *sanbornii*	–/–/4.2/–	Cascade Range foothills and Sierra Nevada foothills, from Shasta County to Calaveras County	Chaparral, oak woodland, lower montane coniferous forest, usually on serpentinite; 250–1,400 m	May–Sep	No recorded occurrences; habitat potentially present in chaparral, oak woodland, and coniferous forest
Slender silver-moss *Anomobryum julaceum*	–/–/4.2/–	Scattered occurrences in California: Butte, Humboldt, Sonoma, Shasta, Santa Cruz, and Mariposa Counties; Oregon and elsewhere	Broadleafed upland forest, lower montane coniferous forest, North Coast coniferous forest on damp rock and soil on outcrops, usually on road cuts; 100–1,000 m	Non-flowering	Pulga; habitat present in coniferous forest
True's manzanita *Arctostaphylos mewukka* ssp. *truei*	–/–/4.2/–	Endemic to the northern Sierra Nevada foothills	Sometimes roadside in chaparral, lower montane coniferous forest; 425–1,390 m	Feb–Jul	Stirling City, Paradise East, Pulga, Soapstone Hill, Berry Creek, Cascade, Forbestown, Clipper Mills; habitat present in chaparral and coniferous forests
Depauperate milk-vetch *Astragalus pauperculus*	–/–/4.3/–	Cascade Range foothills, northern Sacramento Valley	Valley and foothill grassland, chaparral, cismontane woodland; 60–850 m	Mar–Jun	No recorded occurrences; habitat potentially present in annual grassland, chaparral, and oak woodland
Ferris's milk vetch *Astragalus tener* var. *ferrisiae*	–/–/1B.1/–	Historic range included the Central Valley from Butte to Alameda Counties; currently only occurs in Butte and Glenn Counties	Seasonally wet areas in meadows and seeps, subalkaline flats in valley and foothill grassland; 5–75 m	Apr–May	Butte City, Llano Seco, Nord, Pennington, West of Biggs; habitat present in annual grasslands
Woolly-leaved milk-vetch *Astragalus whitneyi* var. *lenophyllus*	–/–/4.3/–	Northern high Sierra Nevada, Klamath Mountains, Modoc Plateau	Alpine boulders, rock fields, rocky subalpine coniferous forest; 2,135–3,050 m	Jul–Aug	Soapstone Hill; habitat present in coniferous forests
Heartscale *Atriplex cordulata* var. *cordulata*	–/–/1B.2/–	Western Central Valley and valleys of adjacent foothills	Saline or alkaline soils in chenopod scrub, meadows and seeps, sandy areas in valley and foothill grassland; below 375 m	Apr–Oct	Pennington; habitat present in annual grasslands

TABLE 13-2 SPECIAL-STATUS PLANTS DOCUMENTED OR IDENTIFIED AS HAVING THE POTENTIAL TO OCCUR IN THE PLANNING AREA

Common and Scientific Name	Legal Status[a] Federal/State/ CNPS/HCP	Geographic Distribution/ Floristic Province	Habitat Requirements	Blooming Period	Quadrangles with Recorded Occurrences of Species[b] and Habitat in the Planning Area
Brittlescale *Atriplex depressa*	–/–/1B.2/–	Western and eastern Central Valley and adjacent foothills on west side of Central Valley	Alkaline or clay soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools; below 320 m	May–Oct	No recorded occurrences; habitat potentially present in annual grasslands and vernal pools
Lesser saltscale *Atriplex minuscula*	–/–/1B.1/–	Sacramento and San Joaquin Valley, Butte County, and from Merced to Kern Counties	Sandy or alkaline soils in chenopod scrub, playas, valley and foothill grassland; 15–200 m	May–Oct	Pennington; habitat present in annual grasslands
Subtle orache *Atriplex subtilis*	–/–/1B.2/–	Central Valley, especially San Joaquin Valley with occurrences in Butte, Fresno, Kings, Kern, Madera, Merced, and Tulare Counties	Alkali scalds and alkali grasslands, often near vernal pools; 40–100 m	Aug–Oct	Pennington; habitat present in annual grasslands
Mexican mosquito fern *Azolla microphylla*	–/–/4.2/–	Scattered occurrences all throughout California	Slow-water marshes, ponds, and swamps; 30–100 m	Aug	Biggs, Loma Rica, Nelson, Oroville, Palermo; habitat present in ponds and freshwater marsh
Big-scale balsamroot *Balsamorhiza macrolepis*	–/–/1B.3/–	Scattered occurrences in the Coast Ranges and Sierra Nevada foothills	Chaparral, cismontane woodland, valley and foothill grassland, sometimes on serpentine soils; 90–1,400 m	Mar–Jun	Brush Creek; habitat present in annual grasslands and chaparral
Resin birch *Betula glandulosa*	–/–/2B.2/–	Cascade Range and Warner Mountains	Bogs and fens, meadows and seeps, marshes and swamps, and mesic areas in lower montane coniferous forest and subalpine coniferous forest	Apr–Aug	No recorded occurrences; habitat potentially present in wet meadow and coniferous forest
Upswept moonwort *Botrychium ascendens*	–/–/2B.3/–	Butte and El Dorado Counties	Lower montane coniferous forest, in grassy fields and near springs and creeks; 1,500–2,100 m	Jul–Aug (fertile)	Humboldt Peak, Jonesville; habitat present in coniferous forest, wet meadow, and along drainages
Scalloped moonwort *Botrychium crenulatum*	–/–/2B.2/–	Scattered occurrences in mountains of California	Lower montane coniferous forest, in moist meadows, bogs and fens, freshwater marsh, and near creeks; 1,500–2,700 m	Jun–Jul (fertile)	Humboldt Peak; habitat present in coniferous forest, wet meadow, freshwater marsh, and along drainages
Mingan moonwort *Botrychium minganense*	–/–/2B.2/–	High Cascade Range and southern high Sierra Nevada	Lower montane coniferous forest, on creek banks; 1500–2,300 m	Jul–Aug (fertile)	Humboldt Peak, Jonesville; habitat present in coniferous forest along drainages
Western goblin *Botrychium montanum*	–/–/2B.1/–	Butte County	Lower montane coniferous forest, on creek banks; 1,500–1,800 m	Jul–Aug (fertile)	Humboldt Peak, Jonesville; habitat present in coniferous forest along drainages

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Watershield *Brasenia schreberi*	–/–/2B.3/–	Northern Coast Ranges, central Great Valley, northern and central Sierra Nevada, Modoc plateau	Freshwater marshes and swamps; 30–2,200 m	Jun–Sep	Llano Seco; habitat present in freshwater marsh
Valley brodiaea *Brodiaea rosea* ssp. *vallicola*	–/–/4.2/–	Endemic to the northern and central Great Valley	Old alluvial terraces; silty, sandy, and gravelly loam soils in swales, valley and foothill grasslands, and vernal pools; 10–355 m	Apr–May	Cherokee, Chico, Hamlin Canyon, Honcut, Nord, Shippee; habitat present in swales, vernal pools, and annual grasslands
Sierra foothills brodiaea *Brodiaea sierrae*	–/–/4.3/–	Endemic to the northern Sierra Nevada foothills	Usually serpentinite or gabbroic soils in chaparral, cismontane woodland, and lower montane coniferous forest; 50–980 m	May–Aug	Bangor, Berry Creek. Cherokee, Clipper Mills, Forbestown, Loma Rica, Oroville, Oroville Dam, Paradise East, Pulga, Rackerby; habitat present in chaparral, woodlands, and coniferous forest
Brassy bryum *Bryum chryseum*	–/–/4.3/–	Scattered occurrences in Amador, Butte, Fresno, Madera, and Mendocino counties	Openings in chaparral, cismontane woodlands, and valley and foothill grasslands; 50–600 m	–	Shippee; habitat present in chaparral, woodlands, and annual grassland
Thread-leaved beakseed *Bulbostylis capillaris*	–/–/4.2/–	Northern and central high Sierra Nevada	Meadows and seeps in montane coniferous forest; 550–2,100 m	Jun–Aug	Berry Creek, Brush Creek, Cherokee, Forbestown, Kimshew Point, Oroville; habitat potentially present in wet meadows
Butte County calycadenia *Calycadenia oppositifolia*	–/–/4.2/–	Endemic to Butte County	Typically volcanic, granitic, or serpentine soils in chaparral, oak woodland, lower montane coniferous forest, cismontane woodland, meadows and seeps, openings in valley and foothill grasslands; 90–945 m	Apr–Jul	Bangor, Berry Creek, Butte Meadows, Chico, Cherokee, Hamlin Canyon, Oroville, Oroville Dam, Paradise East, Paradise West, Pulga, Richardson Springs; habitat present in chaparral, woodlands, coniferous forests, meadows and seeps, and annual grasslands
Butte County morning glory *Calystegia atriplicifolia* ssp. *buttensis*	–/–/4.2/–	Cascade Range foothills	Lower montane coniferous forest, on dry, mostly open slopes, at 600–1,200 m	May–Jul	Butte Meadows, Cohasset, Devils Parade Ground, Kimshew Point, Paradise East, Paradise West, Stirling City; habitat present in coniferous forest

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Flagella-like atractylocarpus *Campylopodiella stenocarpa*	–/–/2B.2/–	Northern Cascade Range and Northern Sierra Nevada foothills	Roadsides and cismontane woodland; 100–500 m	–	Richardson Springs; habitat present along roadsides and in woodlands
Dissected-leaved toothwort *Cardamine pachystigma* var. *dissectifolia*	–/–/1B.2/–	Sierra Nevada foothills and interior North Coast Ranges	Serpentine outcrops	Feb–May	Berry Creek, Cherokee, Clipper Mills, Cohasset, Paradise East, Paradise West, Pulga, Stirling City habitat potentially present in chaparral and coniferous forest
Sierra arching sedge *Carex cyrtostachya*	–/–/1B.2/–	Endemic to the Northern Sierra Nevada with occurrences in Butte, El Dorado, and Yuba counties	Mesic soils in lower montane coniferous forest, meadows and seeps, marshes and swamps, riparian forest margins; 610–1,360 m	May–Aug	Brush Creek. Clipper Mills; habitat present in conifer forest, wet meadows, and riparian woodland margins
Davy's sedge *Carex davyi*	–/–/1B.3/–	Northern and central Sierra Nevada	Subalpine coniferous forest and upper montane coniferous forest; 1,500–3,200 m	May–Aug	Jonesville; habitat present in coniferous forest
Geyer's sedge *Carex geyeri*	–/–/4.2/–	Klamath Ranges and northern Sierra Nevada	Great Basin scrub, lower montane coniferous forest; 1,200–2,100 m	May–Jun	Butte Meadows; habitat present in coniferous forest
Shore sedge *Carex limosa*	–/–/2B.2/–	High Sierra Nevada	Montane coniferous forest, in floating bogs, soggy meadows, and edges of lakes; 1,200–2,800 m	Jun–Aug	Belden, Butte Meadows, Humboldt Peak, Jonesville; habitat present in wet meadow, high-elevation pond, and coniferous forest
Chaparral sedge *Carex xerophila*	–/–/1B.2/–	Endemic to the northern Sierra Nevada foothills	Serpentinite, gabbroic soils in chaparral, cismontane woodland, lower montane coniferous forest; 440–770 m	Mar–Jun	Paradise East, Rackerby; habitat present in chaparral, woodlands, and coniferous forest
Pink creamsacs *Castilleja rubicundula* ssp. *rubicundula*	–/–/1B.2/–	Inner North Coast Ranges with occurrences in Butte, Colusa, Glenn, Lake, and Napa Counties	Serpentine soils in chaparral openings, cismontane woodland, meadows and seeps, valley and foothill grassland; 20–900 m	Apr–Jun	Hamlin Canyon, Nord (presumed extirpated), Oroville, Pennington, Shippee; habitat present in chaparral and annual grasslands
Pappose tarplant *Centromadia parryi* ssp. *parryi*	–/–/1B.2/–	North and Central Coast Ranges, the southern Sacramento Valley; occurrences in Butte, Colusa, Glenn, Lake, Napa, San Mateo, and Solano Counties.	Coastal prairie, meadows and seeps, coastal salt marshes and swamps, alkaline soils in vernally mesic valley and foothill grassland; 2–420 m	May–Nov	Pennington; habitat present in annual grassland and vernal pools

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Parry's rough tarplant *Centromadia parryi* ssp. *rudis*	–/–/4.2/–	Northern and central Great Valley, San Joaquin Valley, and Modoc Plateau	Alkaline, vernally mesic, seeps, sometimes roadsides in valley and foothill grasslands, and vernal pools; 0–100 m	May–Oct	Llano Seco, Pennington, West of Biggs; habitat present in annual grassland and vernal pools
Red Hills soap plant *Chlorogalum grandiflorum*	–/–/1B.2/–	Endemic to the northern Sierra Nevada foothills	Serpentinite, gabbroic and other soils in chaparral, cismontane woodlands, and lower montane coniferous forests; 245–1,690 m	May–Jun	No recorded occurrences; habitat potentially present in chaparral, woodlands, and coniferous forest
Brandegee's clarkia *Clarkia biloba* ssp. *brandegeeae*	–/–/4.2/–	Northern Sierra Nevada foothills from Butte to El Dorado Counties	Chaparral, cismontane woodland, often on roadcuts; 295–885 m	May–Jul	Bangor, Forbestown, Oroville, Oroville Dam; habitat present in chaparral and oak woodland
White-stemmed clarkia *Clarkia gracilis* ssp. *albicaulis*	–/–/1B.2/–	Southern Cascade Range foothills with occurrences in Butte and Tehama Counties	Chaparral and cismontane woodland, sometimes on serpentine soils; 245–1,085 m	May–Jul	Berry Creek, Cherokee, Cohasset, Forbestown, Paradise East, Paradise West, Pulga, Richardson Springs; habitat present in chaparral and oak woodland
Golden-anthered clarkia *Clarkia mildrediae* ssp. *lutescens*	–/–/4.2/–	Endemic to the northern Sierra Nevada foothills; Butte, Plumas, Sierra, and Yuba counties	Often roadcuts, often rocky soils in cismontane woodlands and openings in lower montane coniferous forest; 275–1,750 m	Jun–Aug	Berry Creek. Brush Creek, Cascade, Clipper Mills, Paradise East, Pulga, Soapstone Hill, Strawberry Valley; habitat present in woodlands and openings in coniferous forest
Mildred's clarkia *Clarkia mildrediae* ssp. *mildrediae*	–/–/1B.3/–	Southern Cascade Ranges, northern Sierra Nevada, and Feather River drainage with occurrences in Butte, Plumas, and Yuba Counties	Sandy or granitic soils in shaded areas in cismontane woodland, lower montane coniferous forest; 245–1,710 m	May–Aug	Berry Creek, Cascade, Cohasset, Kimshew Point, Paradise East, Pulga, Soapstone Hill, Stirling City; habitat present in oak woodlands and coniferous forest
Mosquin's clarkia *Clarkia mosquinii*	–/–/1B.1/–	Northern Sierra Nevada foothills in vicinity of Feather River Canyon near Pulga in northeastern Butte County	Rocky, roadside areas in cismontane woodland and lower montane coniferous forest; 185–1,170 m	May–Jul	Berry Creek, Brush Creek, Cascade, Cherokee, Clipper Mills, Forbestown, Oroville Dam, Pulga, Soapstone Hill, Stirling City, Strawberry Valley; habitat present in oak woodlands and coniferous forest

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Marsh claytonia *Claytonia palustris*	–/–/4.3/–	Klamath Ranges, Cascade Range, northern and central high Sierra Nevada	Wet meadows, seeps, marshes, swamps; 1,000–2,500 m	May–Aug	Butte Meadows, Chico, Cohasset, Hamlin Canyon, Humboldt Peak, Jonesville, Paradise West, Stirling City; Habitat present in wet meadows and freshwater marsh
Streambank spring beauty *Claytonia parviflora* ssp. *grandiflora*	–/–/4.2/–	Endemic to the northern, central, and southern Sierra Nevada foothills	Rocky soils in cismontane woodland; 250–1,200 m	Feb–May	Berry Creek, Paradise East; habitat present in woodlands
Red-stemmed cryptantha *Cryptantha rostellata*	–/–/4.2/–	Scattered occurrences throughout northern and central California	Often gravelly, volcanic openings; often roadsides in cismontane woodlands and valley and foothill grasslands; 40–800 m	Apr–Jun	Chico, Honcut; habitat present in woodlands and annual grassland
Peruvian dodder *Cuscuta obtusiflora* var. *glandulosa*	–/–/2B.2/–	Scattered occurrences in Great Valley, northern Coast Ranges, and southern California	Freshwater marshes and swamps; 15–280 m	Jul–Oct	No recorded occurrences; habitat potentially present in freshwater marsh
California lady's-slipper *Cypripedium californicum*	–/–/4.2/–	Klamath Ranges, northern outer North Coast Ranges, western Cascade Range, northern Sierra Nevada, and northwestern San Francisco Bay Area	Bogs and fens, seeps and streambanks in lower montane coniferous forest, usually on serpentine; 30–2,700 m	Apr–Aug	Belden, Berry Creek, Brush Creek, Cascade, Kimshew Point, Pulga; habitat present in wet meadows and coniferous forest
Clustered lady's-slipper *Cypripedium fasciculatum*	–/–/4.2/–	Northern Cascade Ranges, northern Coast Ranges, Modoc Plateau, and northern Sierra Nevada	Usually serpentinite seeps and streambanks in lower montane coniferous forest and North Coast coniferous forest; 100–2,435 m	Mar–Aug	Berry Creek, Brush Creek, Cascade, Clipper Mills, Paradise East, Pulga, Stirling City, Soapstone Hill, Strawberry Valley; habitat present in wet meadow and coniferous forest
California pitcherplant *Darlingtonia californica*	–/–/4.2/–	Klamath Ranges, Cascade Range, northern high Sierra Nevada	Bogs, fens, wet meadows, seeps, generally on serpentine; 0–2,600 m	Apr–Jul	Jonesville, Strawberry Valley; habitat present in wet meadows
Recurved larkspur *Delphinium recurvatum*	–/–/1B.2/–	Central Valley from Colusa* to Kern Counties	Alkaline soils in valley and foothill grassland, saltbush scrub, cismontane woodland; below 750 m	Mar–May	Nelson, Shippee; habitat present in annual grasslands and oak woodlands
English sundew *Drosera anglica*	–/–/2B.3/–	Scattered locations in Klamath Ranges, Cascade Range, northern high Sierra Nevada, and Warner Mountains	Bogs and fens, meadows and seeps; 1,400–2,000 m	Jun–Aug	Butte Meadows; habitat present in wet meadows

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Small spikerush *Eleocharis parvula*	–/–/4.3/–	Scattered locations in north Coast Ranges and northern and southern California	Marshes and swamps; 1–3,020 m	Jun–Aug	No recorded occurrences; habitat potentially present in freshwater marshes
Clifton's eremogone *Eremogone cliftonii*	–/–/1B.3/–	Northern Sierra Nevada and foothills	Granitic and ultramafic openings in chaparral, lower montane coniferous forest, and upper montane coniferous forest; 455–2,080 m	Apr–Sep	Brush Creek, Cascade, Jonesville, Kimshew Point, Pulga, Soapstone Hill; habitat present in chaparral and coniferous forest
Hot rock daisy *Erigeron inornatus* var. *calidipetris*	–/–/4.3/–	Cascade Range and Modoc Plateau	Volcanic sand, in lower montane coniferous forest; 1,100–1,900 m	Jun–Sep	Jonesville; habitat present in coniferous forest
Northern Sierra daisy *Erigeron petrophilus* var. *sierrensis*	–/–/4.3/–	Northern Sierra Nevada foothills	Cismontane woodland, montane coniferous forest, sometimes on serpentine; 300–2,000 m	Jun–Oct	Belden, Clipper Mills, Paradise East, Pulga, Soapstone Hill; habitat present in coniferous forest
Ahart's buckwheat *Eriogonum umbellatum* var. *ahartii*	–/–/1B.2/–	Endemic to the Northern Sierra Nevada in Butte, Plumas, Sierra, and Yuba Counties	Serpentinite soils, slopes, and openings in chaparral and cismontane woodland; 400–2,000 m	Jun–Sep	Berry Creek, Cascade, Cherokee, Clipper Mills, Cohasset, Paradise East, Paradise West, Stirling City, Pulga; habitat present in chaparral and woodlands
Slender cottongrass *Eriophorum gracile*	–/–/4.3/–	Scattered occurrences throughout the northern Coast Ranges and northern Sierra Nevada	Acidic soils in bogs and fens, meadows and seeps, and upper montane coniferous forest; 1,280–2,900 m	May–Sep	Belden, Butte Meadows, Jonesville, Kimshew Point; habitat present in wet meadow, and coniferous forests
Fern-leaved monkeyflower *Erythranthe filicifolia*	–/–/1B.2/–	Endemic to Butte and Plumas Counties	Ephemeral seeps (usually slow draining) among exfoliating granitic slabs in chaparral, lower montane coniferous forest, ephemeral meadows and seeps; 415–1,710 m	Apr–Jun	Berry Creek, Clipper Mills, Cascade, Pulga, Soapstone Hill; habitat present in chaparral, coniferous forest, and wet meadow

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Shield-bracted monkeyflower *Erythranthe glaucescens*	–/–/4.3/–	Southern Cascade Range foothills and northern Sierra Nevada foothills	Serpentine seeps in valley and foothill grassland, chaparral, cismontane woodland, lower montane coniferous forest; 60–1,250 m	Feb–Aug	Berry Creek, Butte Meadows, Campbell Mound, Cherokee, Chico, Cohasset, Hamlin Canyon, Honcut, Humboldt Peak, Jonesville, Loma Rica, Nord, Oroville Dam, Paradise East, Paradise West, Pulga, Richardson Springs, Stirling City; habitat potentially present in annual grassland, chaparral, oak woodlands, and coniferous forest
Small-flowered monkeyflower *Erythranthe inconspicua*	–/–/4.3/–	Endemic to the northern and central Sierra Nevada foothills	Mesic soils in chaparral, cismontane woodlands, and lower montane coniferous forests; 274–760 m	May–Jun	Berry Creek, Cherokee; habitat present in chaparral, woodlands, and coniferous forest
Hoover's spurge *Euphorbia hooveri*	T/–/1B.2/CS	Endemic to the central and southern Great Valley in Butte, Colusa, Glenn, Merced, Stanislaus, Tehama, and Tulare Counties	Vernal pools; 25–250 m	Jul–Sep	Hamlin Canyon, Nord, Richardson Springs NW, Vina; habitat present in vernal pools
Minute pocket moss *Fissidens pauperculus*	–/–/1B.2/–	North Coast Ranges, San Francisco Bay Area, and several disjunct occurrences throughout Butte, Nevada, and Plumas Counties	Damp coastal soils in North Coast coniferous forest; 10–1,024 m	–	Forbestown, Brush Creek, Clipper Mills; habitat present in damp soils within coniferous forest
Caribou coffeeberry *Frangula purshiana* ssp. *ultramafica*	–/–/1B.2/–	Endemic to the Northern Sierra Nevada in Butte, Plumas, and Sierra counties	Serpentinite soils in chaparral, lower montane coniferous forest, meadows and seeps, upper montane coniferous forest; 825–1,930 m	May–Jul	Paradise East; habitat present in chaparral and coniferous forests
Butte County fritillary *Fritillaria eastwoodiae*	–/–/3.2/–	Sierra Nevada foothills from Shasta to Yuba Counties	Chaparral, cismontane woodland, and openings in lower montane coniferous forest, sometimes on serpentine; 50–1,500 m	Mar–May	Berry Creek, Brush Creek, Cascade, Cherokee, Chico, Clipper Mills, Cohasset, Forbestown, Hamlin Canyon, Kimshew Point, Oroville, Oroville Dam, Paradise East, Paradise West, Pulga, Stirling City; habitat present in chaparral, oak woodlands, and coniferous forest

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Adobe-lily *Fritillaria pluriflora*	–/–/1B.2/–	Northern Sierra Nevada foothills, Inner North Coast Ranges, and edges of Sacramento Valley	Often adobe soils in chaparral, cismontane woodland, valley and foothill grassland; 60–705 m	Feb–Apr	Chico, Nord, Richardson Springs, Richardson Springs NW, Shippee; habitat present in chaparral, oak woodlands, and annual grasslands
Hogwallow starfish *Hesperevax caulescens*	–/–/4.2/–	Endemic to California; scattered occurrences throughout California	Mesic, clay, sometimes alkaline soils in valley and foothill grasslands and shallow vernal pools; 0–505 m	Mar–Jun	Nord, Richardson Springs, Shippee; habitat present in annual grassland and vernal pools
Water star-grass *Heteranthera dubia*	–/–/2B.2/–	Small portion of the southern Cascade Range within Fall River Mills, northern Great Valley, San Francisco Bay Area, Modoc Plateau	Requires a pH of 7 or higher, usually in slightly eutrophic waters, alkaline, still or slow-moving water in marshes and swamps; 30–1,495 m	Jul–Oct	Pennington, Sanborn Slough; habitat present in freshwater marsh
Rose-mallow *Hibiscus lasiocarpos* var. *occidentalis*	–/–/1B.2/–	Central and southern Sacramento Valley, deltaic Central Valley, and elsewhere in the United States	Freshwater marsh along rivers and sloughs; below 120 m	Jun–Sep	Butte City, Hamlin Canyon, Llano Seco, Nelson, Ord Ferry, Oroville, Paradise West, Pennington, Richardson Springs, Sanborn Slough, Shippee, West of Biggs; habitat present within freshwater marsh along drainages and flooded agricultural fields
Baker's globe mallow *Iliamna bakeri*	–/–/4.2/–	Cascade Range and Modoc Plateau	Chaparral, pinyon-juniper woodland; 1,000–2,500 m	Jun–Sep	Devils Parade Ground; habitat present in woodlands
California satintail *Imperata brevifolia*	–/–/2B.1/–	Scattered occurrences throughout northern and southern California ranging from the northern Sierra Nevada, southern Great Valley, Transverse Ranges, Mojave Desert, and Peninsular Ranges	Mesic soils in chaparral, coastal scrub, Mojavean desert scrub, alkali meadows and seeps, riparian scrub; 0–1,215 m	Sep–May	Paradise West, Richardson Springs; habitat present in chaparral, and wet meadow
Ahart's dwarf rush *Juncus leiospermus* var. *aharti*	–/–/1B.2/–	Eastern Sacramento Valley, northeastern San Joaquin Valley with occurrences in Butte, Calaveras, Placer, Sacramento, and Yuba Counties	Wet areas in valley and foothill grassland, vernal pool margins; 30–100 m	Mar–May	Biggs, Honcut, Palermo; habitat present in annual grasslands and vernal pools

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Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*	–/–/1B.1/–	Northern Sacramento Valley and Cascade Range foothills with occurrences in Butte, Shasta, and Tehama Counties	Seasonally wet areas in chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools; 35–1,020 m	Mar–May	Campbell Mound, Cherokee, Oroville, Richardson Springs, Shippee; habitat present in chaparral, oak woodlands, annual grasslands, and vernal pools.
Forked hare-leaf (*Lagophylla dichotoma*)	–/–/1B.1/–	Endemic to the central Sierra Nevada foothills	Cismontane woodlands or valley and foothill grassland; 45–355 m	Apr–May	No recorded occurrences; habitat potentially present in woodlands and annual grasslands
Ferris' goldfields (*Lasthenia ferrisiae*)	–/–/4.2/–	Endemic to California; scattered occurrences in northern and southern California	Alkaline and clay vernal pools; 20–700 m	Feb–May	No recorded occurrences; habitat potentially present in vernal pools
Colusa layia *Layia septentrionalis*	–/–/1B.2/–	Northern Coast Ranges, Great Valley, and Lake Oroville	Sandy or serpentinite soils within chaparral, cismontane woodland, and valley and foothill grassland; 100–1095 m	Apr–May	Cherokee; habitat present in chaparral, woodlands, and annual grassland
Bristly leptosiphon (*Leptosiphon acicularis*)	–/–/4.2/–	Endemic to the north Coast Ranges and San Francisco Bay Area	Chaparral, cismontane woodland, coastal prairie, valley and foothill grassland	Apr–Jul	No recorded occurrences; habitat potentially present in woodlands and annual grassland
Cantelow's lewisia *Lewisia cantelovii*	–/–/1B.2/–	Canyons of the Sacramento River, North and Middle Forks of the Feather River, and Yuba River	Moist areas on serpentine or granite in chaparral, cismontane woodland, broadleaved upland forest, lower montane coniferous forest; 385–1,370 m	May–Oct	Brush Creek, Pulga, Soapstone Hill; habitat present in chaparral, oak woodlands, and coniferous forest
Hutchison's lewisia *Lewisia kelloggii* ssp. *hutchisonii*	–/–/3.2/–	Northern Sierra Nevada	Openings in upper montane coniferous forest; 1,800-2,100 m	Jul–Aug	Jonesville; habitat present in coniferous forest
Humboldt lily *Lilium humboldtii* ssp. *humboldtii*	–/–/4.2/–	Southern Cascade Range and high Sierra Nevada	Openings in chaparral, cismontane woodland, lower montane coniferous forest; 100-1,000 m	May–Jul	Berry Creek, Butte Meadows, Clipper Mills, Cohasset, Forbestown, Oroville, Oroville Dam, Paradise East, Paradise West, Stirling City; habitat present in chaparral, oak woodland, and coniferous forest
Butte County meadowfoam *Limnanthes floccosa* ssp. *californica*	E/E/1B.1/CS	Endemic to Butte County	Wet areas in valley and foothill grassland, vernal pools and swales; 50–930 m	Mar–May	Chico, Nord, Oroville, Richardson Springs, Shippee; habitat present in annual grasslands and vernal pools

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Woolly meadowfoam *Limnanthes floccosa* ssp. *floccosa*	–/–/4.2/–	Northern Sacramento Valley and Cascade Range foothills, from Siskiyou to Butte County	Vernal pools and swales	Mar–Jun	Campbell Mound, Nord, Palermo, Richardson Springs, Richardson Springs NW, West of Biggs; habitat potentially present in vernal pools
Three-ranked hump moss (*Meesia triquetra*)	–/–/4.2/–	Sierra Nevada range, north Coast Range (Humboldt County), and Modoc Plateau	On soil in bogs and fens, meadows and seeps, subalpine coniferous forest, and mesic soils in upper montane coniferous forest	July	Butte Meadows, Jonesville; habitat present in wet meadow and coniferous forests
Broad-nerved hump moss *Meesia uliginosa*	–/–/2B.3/–	Scattered occurrences throughout California, primarily in Sierra Nevada and southern Cascade Range.	Damp soils in bogs and fens, meadows and seeps, subalpine coniferous forest, and upper montane coniferous forest; 1,210–2,804 m	Jun, Oct	Jonesville; habitat present in damp soils within wet meadow, coniferous forest
Marshall's saxifrage *Micranthes marshallii*	–/–/4.3/–	Scattered occurrences throughout the north Coast Ranges	Rocky streambanks in riparian forest; 90–2,130 m	Mar–Aug	No recorded occurrences; habitat potentially present in riparian woodland
Sylvan microseris *Microseris sylvatica*	–/–/4.2/–	Endemic to California; scattered occurrences throughout northern and southern California	Chaparral, cismontane woodland, Great Basin scrub, pinyon and juniper woodland, serpentinite soils in valley and foothill grassland; 45–1,500 m	Mar–Jun	Oroville Dam; habitat present in woodlands and annual grassland
Tracy's sanicle *Sanicula tracyi*	–/–/4.2/–	Endemic to the northern Coast Ranges, Klamath Mountains, northern Sierra Nevada foothills	Openings within cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest; 100–1,585 m	Apr–Jul	Clipper Mills, Cascade, Brush Creek; habitat present in woodlands and coniferous forest
Veiny monardella *Monardella venosa*	–/–/1B.1/–	Occurrences in the northern and central Sierra Nevada foothills; also historically known from the Sacramento Valley	Clay soils in cismontane woodland, valley and foothill grassland; 60–410 m	Mar–Jul	Cherokee, Hamlin Canyon; habitat present in annual grassland and oak woodlands
Cotula navarretia *Navarretia cotulifolia*	–/–/4.2/–	Endemic to the north Coast Ranges	Adobe soils in chaparral, cismontane woodland, valley and foothill grassland; 4–1,830 m	May–Jun	No recorded occurrences; habitat potentially present in chaparral, woodlands, and annual grassland
Tehama navarretia *Navarretia heterandra*	–/–/4.3/–	Interior North Coast Ranges, Cascade Range foothills, western Sacramento Valley, eastern San Francisco Bay Area, interior South Coast Ranges, and Modoc Plateau	Mesic areas in valley and foothill grasslands, vernal pools	Apr–Jun	Hamlin Canyon, Nord, Richardson Springs, Richardson Springs NW, Shippee; habitat present in annual grassland and vernal pools

TABLE 13-2 SPECIAL-STATUS PLANTS DOCUMENTED OR IDENTIFIED AS HAVING THE POTENTIAL TO OCCUR IN THE PLANNING AREA

Common and Scientific Name	Legal Status[a] Federal/State/ CNPS/HCP	Geographic Distribution/ Floristic Province	Habitat Requirements	Blooming Period	Quadrangles with Recorded Occurrences of Species[b] and Habitat in the Planning Area
Adobe navarretia (*Navarretia nigelliformis* ssp. *nigelliformis*)	–/–/4.2/–	Endemic to California; scattered occurrences throughout northern and southern California	Clay and sometimes serpentinite soils in vernally mesic valley and foothill grasslands and sometimes in vernal pools; 100–1,000 m	Apr–Jun	Biggs, Cherokee, Chico, Hamlin Canyon, Nord, Richardson Springs NW, Shippee; habitat present in annual grassland and vernal pools
Awl-leaved navarretia *Navarretia subuligera*	–/–/4.3/–	Interior North Coast Ranges, northern Sierra Nevada foothills, and Sacramento Valley	Rocky, mesic areas in chaparral, cismontane woodland, lower montane coniferous forest; 150–1,100 m	Apr–Aug	No recorded occurrences; habitat potentially present in chaparral, oak woodland, and coniferous forest
California adder's-tongue *Ophioglossum californicum*	–/–/4.2/–	Scattered occurrences throughout the Coast Ranges, Peninsular Range	Mesic soils in chaparral, valley and foothill grassland, and vernal pools margins; 60–525 m	Jan–Jul	No recorded occurrences; habitat potentially present in chaparral, annual grassland, and vernal pools
Tall alpine-aster *Oreostemma elatum*	–/–/1B.2/–	Northern Sierra Nevada	Mesic soils in bogs, fens, meadows, seeps, upper montane coniferous forest; 1,005–2,100 m	Jun–Aug	Belden, Jonesville; habitat present in wet meadow and coniferous forests
Hairy Orcutt grass *Orcuttia pilosa*	E/E/1B.1/CS	Scattered locations along eastern edge of Central Valley and adjacent foothills from Tehama to Merced Counties	Vernal pools; 55–200 m	May–Sep	Hamlin Canyon, Richardson Springs NW, Vina; habitat present in vernal pools
Slender Orcutt grass *Orcuttia tenuis*	T/E/1B.1/CS	Sierra Nevada and Cascade Range foothills from Siskiyou to Sacramento Counties	Vernal pools; 35–1,760 m	May–Oct	Palermo, Richardson Springs NW, Vina; habitat present in vernal pools
Lewis Rose's ragwort *Packera eurycephala* var. *lewisrosei*	–/–/1B.2/–	Northern Sierra Nevada and foothills	Serpentinite soils in chaparral, cismontane woodland, lower montane coniferous forest; 274–1,890 m	Mar–Jul	Pulga, Paradise East, Berry Creek, Cherokee, Jonesville; habitat present in chaparral, woodlands, and coniferous forest
Layne's ragwort *Packera layneae*	T/R/1B.2/–	Endemic to northern Sierra Nevada foothills; El Dorado, Placer, Tuolumne, and Yuba Counties	Serpentinite or gabbroic, rocky soils in chaparral and cismontane woodland; 200–1,085 m	Apr–Aug	No recorded occurrences; habitat potentially present in chaparral and woodlands
Ahart's paronychia *Paronychia ahartii*	–/–/1B.1/–	Northern Central Valley in Butte, Shasta, and Tehama Counties	Cismontane woodland, valley and foothill grassland, vernal pools; 30–510 m	Mar–Jun	Honcut, Oroville, Richardson Springs, Shippee; habitat present in annual grasslands, oak woodlands, and vernal pools
Shasta beardtongue *Penstemon heterodoxus* var. *shastensis*	–/–/4.3/–	Cascade Range: Siskiyou County to Plumas County	Dry meadows, outcrops, in chaparral, montane coniferous forest; 1,100–2,400 m	Jun–Sep	Jonesville; habitat present in chaparral and coniferous forest

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Bacigalupi's yampah (*Perideridia bacigalupii*)	–/–/4.2/–	Endemic to the Sierra Nevada foothills	Serpentinite soils of lower montane coniferous forest and chaparral; 450–1,035 m	Jun–Aug	Berry Creek, Clipper Mills, Rackerby; habitat present in coniferous forests and chaparral
Closed-throated beardtongue *Penstemon personatus*	–/–/1B.2/–	Northern Sierra Nevada	Chaparral, montane coniferous forest, on metavolcanic substrates	Jun–Sep	Kimshew Point, Paradise East, Pulga, Stirling City; habitat present in chaparral and coniferous forest
Coleman's rein orchid (*Piperia colemanii*)	–/–/4.3/–	Endemic to the Modoc Plateau and northern Sierra Nevada	Sandy soils in chaparral and lower montane coniferous forest; 1,200–2,300 m	Jun–Aug	Cascade; habitat present in chaparral and coniferous forests
Michael's rein orchid (*Piperia michaelii*)	–/–/4.2/–	Endemic to the northern and southern Coast Ranges and Tuolumne County	Coastal bluff scrub, closed–cone coniferous forest, chaparral, cismontane woodland, coastal scrub, and lower montane coniferous forest; 3–915 m	Apr–Aug	No recorded occurrences; habitat potentially present in coniferous forest, chaparral, and woodlands
Wine-colored tufa moss (*Plagiobryoides vinosula*)	–/–/4.2/–	Scattered occurrences throughout California	Usually in granitic rock or granitic soil along seeps and streams, sometimes in clay; 30–1,735 m	–	Biggs; habitat present in wet meadows and drainages
Sierra blue grass *Poa sierrae*	–/–/1B.3/–	Endemic to the Northern Sierra Nevada and southern Cascade Range	Openings in lower montane coniferous forest; 365–1,500 m	Apr–June	Brush Creek. Berry Creek, Cascade, Forbestown, Pulga, Soapstone Hill; habitat present in coniferous forest
Bidwells' knotweed *Polygonum bidwelliae*	–/–/4.3/–	Cascade Range foothills and northern Sierra Nevada foothills	Valley and foothill grassland, chaparral, cismontane woodland; 60–1,200 m	Apr–Jul	Campbell Mound, Cherokee, Devils Parade Ground, Paradise East, Paradise West, Richardson Springs, Shippee; habitat potentially present in annual grassland, chaparral, and oak woodland
Kruckeberg's sword fern *Polystichum kruckebergii*	–/–/4.3/–	Cascade Range, northern and central high Sierra Nevada, San Bernardino Mountains	Rocky places in upper montane and subalpine coniferous forest; 2,100–3,200 m	Jun–Aug (fertile)	No recorded occurrences; habitat potentially present in coniferous forest
California alkali grass *Puccinellia simplex*	–/–/1B.2/–	Scattered occurrences all throughout Butte to San Bernardino Counties	Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools, alkaline and vernally mesic sinks, flats, and lake margins; 2–930 m	Mar–May	Pennington; habitat present in wet meadows, annual grassland, and reservoir margins

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Alder buckthorn *Rhamnus alnifolia*	–/–/2B.3/–	Northern Sierra Nevada	Lower montane coniferous forest, meadows and seeps, riparian scrub, upper montane coniferous forest; 1,370–2,130 m	May–Jul	Soapstone Hill; habitat present in coniferous forest, wet meadow, and riparian woodland
California beaked-rush *Rhynchospora californica*	–/–/1B.1/–	Scattered occurrences in northwestern California, northern and central Sierra Nevada foothills, and northern San Francisco Bay	Bogs and fens, meadows and seeps, lower montane coniferous forest, freshwater marshes and swamps; 45–1,010 m	May–Jul	Paradise West, Richardson Springs; habitat present in wet meadow, freshwater marsh, and coniferous forest
Brownish beaked-rush *Rhynchospora capitellata*	–/–/2B.2/–	Scattered occurrences in Northwestern California and northern Sierra Nevada foothills	Freshwater marshes and seeps	Jul–Aug	Brush Creek, Cascade, Clipper Mills, Kimshew Point, Paradise West, Pulga; habitat present in freshwater marsh and wet meadow
Hall's rupertia *Rupertia hallii*	–/–/1B.2/–	Sierra Nevada foothills: Butte and Tehama Counties	Cismontane woodland, lower montane coniferous forest, on disturbed soils of roadsides and logged forests, at 1,000–1,400 m	Jun–Aug	Butte Meadows, Cohasset, Devils Parade Ground, Stirling City; habitat present in oak woodland and coniferous forest
Sanford's arrowhead *Sagittaria sanfordii*	–/–/1B.2/–	Scattered locations in Central Valley and Coast Ranges	Freshwater marsh, sloughs, canals, and other slow-moving water habitats below 610 m	May–Oct	Berry Creek, Biggs, Gridley, Richardson Springs NW; habitat present in drainages and freshwater marsh
Water bulrush *Schoenoplectus subterminalis*	–/–/2B.2/–	Klamath Ranges and northern high Sierra Nevada	Montane coniferous forest, on lake margins, in shallow water, at 750–2,300 m	Jul–Aug	Jonesville; habitat present in coniferous forest and along open water
Feather River stonecrop *Sedum albomarginatum*	–/–/1B.2/–	Endemic to the northern Sierra Nevada foothills of Plumas and Butte Counties	Serpentine soils in chaparral, lower montane coniferous forest; 260–1,785 m	May–Jun	Pulga; habitat present in chaparral and coniferous forest
Giant checkerbloom *Sidalcea gigantea*	–/–/4.3/–	Endemic to the northern Sierra Nevada	Meadows and seeps within lower and upper montane coniferous forests; 670–1,950 m	Jan–Jun	Berry Creek, Cascade, Clipper Mills, Kimshew Point, Paradise East, Pulga, Stirling City, Soapstone Hill; habitat present in wet meadows and conifer forest
Butte County checkerbloom *Sidalcea robusta*	–/–/1B.2/CS	Endemic to Butte County	Chaparral, cismontane woodland; 90–1,600 m	Apr–Jun	Cherokee, Chico, Cohasset, Hamlin Canyon, Paradise West, Richardson Springs; habitat present in chaparral and oak woodland

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Long-stiped campion *Silene occidentalis* ssp. *longistipitata*	–/–/1B.2/–	Southern high Cascade Range: Tehama and Butte Counties	Chaparral, montane coniferous forest, at 1,000–2,000 m	Jul–Aug	Butte Meadows, Humboldt Peak, Jonesville; habitat present in chaparral and coniferous forest
Long-leaved starwort *Stellaria longifolia*	–/–/2B.2/–	High Cascade Ranges: Shasta and Butte Counties	Meadows and seeps, riparian woodland, at 900–1,800 m	May–Jul	Butte Meadows, Humboldt Peak, Jonesville; habitat present in wet meadows and along drainages in riparian
Obtuse starwort *Stellaria obtusa*	–/–/4.3/–	Outer North Coast Ranges, Cascade Range, central Sierra Nevada foothills, northern and central high Sierra Nevada, and Modoc Plateau	Riparian woodland, mesic area in montane coniferous forest; 150–2,100 m	May–Oct	Belden, Berry Creek, Butte Meadows, Humboldt Peak, Jonesville, Kimshew Point; habitat potentially present in riparian woodland and coniferous forest along drainages
Sickle-fruit jewelflower *Streptanthus drepanoides*	–/–/4.3/–	Southernmost Klamath Ranges, high North Coast Ranges, northern interior North Coast Ranges, and northern Sierra Nevada Foothills	Chaparral, cismontane woodland, lower montane coniferous forest, on serpentine; 300–1,700 m	Apr–Jun	Cherokee; habitat present in chaparral, oak woodland, and coniferous forest
Long-fruit jewelflower (*Streptanthus longisiliquus*)	–/–/4.3/–	Endemic to the northern Sierra Nevada and southern Cascade Range	Openings in cismontane woodland and lower montane coniferous forest; 715–1,500 m	Apr–Sep	Berry Creek, Butte Meadows, Cohasset, Devils Parade Ground, Paradise East, Pulga, Stirling City; habitat present in woodlands and coniferous forest
Slender-leaved pondweed *Stuckenia filiformis* ssp. *alpina*	–/–/2B.2/–	San Joaquin Valley, San Francisco Bay Area, and the central high Sierra Nevada	Assorted shallow freshwater marshes and swamps; 300–2,150 m	May–Jul	Chico; habitat present in freshwater marshes
Water awlwort *Subularia aquatica* ssp. *americana*	–/–/4.3/–	Northern Sierra Nevada	Lake margins in upper montane coniferous forest; 1,900–3,100 m	Jul–Sep	Jonesville; habitat present in reservoir margins in coniferous forest
Butte County golden clover *Trifolium jokerstii*	–/–/1B.2/–	Endemic to Butte County	Wet areas in valley and foothills grassland, vernal pools; 50–385 m	Jun–Aug	Oroville, Shippee; habitat present in annual grasslands and vernal pools

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Common and Scientific Name	Legal Status[a] Federal/State/ CNPS/HCP	Geographic Distribution/ Floristic Province	Habitat Requirements	Blooming Period	Quadrangles with Recorded Occurrences of Species[b] and Habitat in the Planning Area
Greene's tuctoria *Tuctoria greenei*	E/R/1B.1/CS	Scattered distribution along eastern Central Valley and foothills from Shasta to Tulare Counties	Dry vernal pools; 30–1,070 m	May–Sep	Biggs, Hamlin Canyon, Llano Seco, Nord, Richardson Springs NW, Shippee; habitat present in vernal pools
Flat-leaved bladderwort *Utricularia intermedia*	–/–/2B.2/–	Scattered occurrences in Cascade Range, high Sierra Nevada, and Modoc Plateau	Bogs, meadows, seeps, marshes, lake margins, at 1,200–2,700 m	Jul–Aug	Butte Meadows, Jonesville; habitat present in wet meadows and along high-elevation open water
Lesser bladderwort *Utricularia minor*	–/–/2.2/–	Northern Sierra Nevada and one occurrence in Mono County	Calcium-rich water in bogs and fens and assorted shallow freshwater marshes and swamps; 800–2,900 m	Jul–Aug	No recorded occurrences; habitat potentially present in freshwater marshes
Felt-leaved violet *Viola tomentosa*	–/–/4.2/–	Endemic to the northern Sierra Nevada	Gravelly soils in lower montane coniferous forest, subalpine coniferous forest, upper montane coniferous forest; 1,435–2,000 m	May–Oct	Cascade; habitat present in coniferous forest
Columbian watermeal *Wolffia brasiliensis*	–/–/2B.3/–	Few occurrences along Sacramento River in Butte and Glenn Counties; elsewhere	Shallow freshwater in marshes and swamps; 30–100 m	Apr-Dec	Llano Seco, Ord Ferry, Pennington; habitat present in freshwater marsh and along drainages

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[a] Status explanations:

Federal
E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
– = no listing under the federal Endangered Species Act.

State
E = listed as endangered under the California Endangered Species Act.
R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.
– = no listing under the California Endangered Species Act.

California Native Plant Society
1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.
3 = List 3 species: plants about which more information is needed to determine their status.
4 = List 4 species: plants of limited distribution.
– = no listing by the California Native Plant Society.

CNPS Code Extensions
.1 = seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat).
.2 = fairly endangered in California (20-80% of occurrences threatened).
.3 = not very endangered in California (<20% of occurrences threatened or no current threats known).

Butte County Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP)
CS = Covered Species
– = not covered under the Butte County HCP/NCCP

[b] Known occurrences from California Natural Diversity Database 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. And California Native Plant Society, Rare Plant Program, 2021. *Inventory of Rare and Endangered Plants in California*. (Online Edition, Version 8-03 0.39.) Available: <http://www.rareplants.org>. Accessed February 2021. U.S. Fish and Wildlife Service. 2021. USFWS Resource Report List. Information for Planning and Conservation. Internet website: https://ecos.fws.gov/ipac/. Date accessed: February 2021.

Notes:
m = meters.
* = known populations believed extirpated from that county.

TABLE 13-3 SPECIAL-STATUS WILDLIFE SPECIES DOCUMENTED OR IDENTIFIED AS HAVING THE POTENTIAL TO OCCUR IN THE PLANNING AREA

Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
Invertebrates				
Conservancy fairy shrimp *Branchinecta conservatio*	E/–/CS	Disjunct occurrences in Solano, Merced, Tehama, Butte, and Glenn Counties.	Large, deep vernal pools in annual grasslands.	Nord, Vina
Vernal pool fairy shrimp *Branchinecta lynchi*	T/–/CS	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County.	Common in vernal pools; also found in sandstone rock outcrop pools.	Biggs, Llano Seco, Nord, Shippee
Vernal pool tadpole shrimp *Lepidurus packardi*	E/–/CS	Shasta County south to Merced County.	Vernal pools and ephemeral stock ponds.	Chico, Hamlin Canyon, Honcut, Llamo Seco, Nord
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/–/CS	Stream side habitats below 3,000 feet throughout the Central Valley.	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant.	Biggs, Chico, Foster Island, Glenn, Llano Seco, Richardson Springs
Amphibians				
Southern long-toed salamander *Ambystoma macrodactylum sigillatum*	–/SSC/–	Northeastern California, along the northern Sierra Nevada south to Garner Meadows and Spicer Reservoir, and in Trinity and Siskiyou counties near the Trinity Alps.	Alpine meadows, high mountain ponds, and lakes at elevations up to about 10,000 ft.	Jonesville
California tiger salamander *Ambystoma californiense*	T/SSC/–	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County.	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy	Pennington (considered extirpated)
Western spadefoot *Spea hammondii*	–/SSC/CS	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California.	Shallow streams with riffles and seasonal wetlands, such as vernal pools in annual grasslands and oak woodlands.	Bangor, Cherokee, Hamlin Canyon, Honcut, Palmero, Nord, Oroville, Palermo, Richardson Springs, Shippee,
California red-legged frog *Rana draytonii*	T/SSC/–	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County.	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation. May estivate in rodent burrows or cracks during dry periods.	Berry Creek

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Foothill yellow-legged frog (Feather River clade) *Rana boylii*	–/SSC/CS	Occurs in the North Feather River and Upper Feather River watersheds in Butte, Plumas, and Lassen counties, up to approximately 6,000 feet.	Creeks or rivers in woodlands or forests with rock and gravel substrate and low overhanging vegetation along the edge. Usually found near riffles with rocks and sunny banks nearby.	Bangor, Berry Creek, Brush Creek, Cascade, Cherokee, Clipper Mills, Cohasset, Forbestown, Hamlin Canyon, Kimshew Point, Ord Ferry, Oroville, Oroville Dam, Paradise East, Paradise West, Pulga, Rackerby, Richardson Springs, Stirling City,
Cascades frog *Rana cascadae*	–/C/–	Found in the Shasta-Trinity region east to the Modoc Plateau and south to the Lassen area and the upper Feather river system.	Ephemeral and permanent ponds and streams. Oviposition habitat is open, shallow water in unshaded areas. Overwinter underwater or in saturated ground.	Belden, Butte Meadows, Humboldt Peak, Jonesville, Kimshew Point, Onion Butte
Sierra Nevada yellow-legged frog *Rana sierrae*	E/T/–	Historically ranged from Plumas County south through the Sierra Nevada to Inyo County. The southern part of the range is marked by Middle and South Forks of the Kings River. This frog also occurs at locations east of the Sierra Nevada crest.	Associated with streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats.	Butte Meadows, Clipper Mills, Jonesville, Humboldt Peak, Strawberry Valley
Reptiles				
Northwestern pond turtle *Actinemys marmorata*	–/SSC/CS	Occurs from the Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of Sierra Nevada.	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests.	Berry Creek, Biggs, Brush Creek, Chico, Ord Ferry, Oroville, Palermo, Paradise West, Pennington, Pulga, Sanborn Slough, Shippee
Blainsville's horned lizard *Phrynosoma blainvillii*	–/SSC/–	Sacramento Valley, including foothills, south to southern California; Coast Ranges south of Sonoma County; below 4,000 feet in northern California.	Chaparral, cismontane woodland, coastal bluff scrub, coastal scrub, desert wash, pinon and juniper woodlands, riparian scrub, riparian woodlands, valley and foothill grassland. Needs open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Hamlin Canyon, Oroville

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Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
Giant garter snake *Thamnophis gigas*	T/T/CS	Central Valley from Fresno north to the Gridley/Sutter Buttes area; has been extirpated from areas south of Fresno.	Sloughs, canals, and other small waterways where there is a prey base of small fish and amphibians; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	Biggs, Butte City, Gridley, Llano Seco, Nelson, Ord Ferry, Pennington, Sanborn Slough, Shippee, West of Biggs
Birds				
Great blue heron (rookery) *Ardea herodias*	–/WN–	Nests in suitable habitat throughout California except at higher elevations in Sierra Nevada and Cascade mountain ranges.	Widely distributed in freshwater and calm-water intertidal habitats.	Llano Seco, Ord Ferry, Shippee
Great egret (rookery) *Ardea alba*	–/WN/–	In northern California, common permanent resident in coastal lowlands, inland valleys, and the Central Valley. Locally abundant March to July near the larger nesting colonies.	Feeds and rests in fresh and saline emergent wetlands, along the margins of estuaries, lakes, and slow-moving streams, on mudflats and salt ponds, and in irrigated croplands and pastures; nests in large trees, and roosts in trees.	Llano Seco, Ord Ferry
Osprey *Pandion haliaetus*	–/WL/–	Nests along the north coast from Marin County to Del Norte County, east through the Klamath and Cascade Ranges, and in the upper Sacramento Valley. Important inland breeding populations at Shasta Lake, Eagle Lake, and Lake Almanor and small numbers elsewhere south through the Sierra Nevada. Winters along the coast from San Mateo County to San Diego County.	Nests in snags, trees, or utility poles near the ocean, large lakes, or rivers with abundant fish populations.	Butte Meadows, Foster Island, Glenn, Jonesville, Llano Seco, Ord Ferry, Oroville, Oroville Dam, Stirling City
White-tailed kite *Elanus leucurus*	–/FP/CS	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County.	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands.	No CNDDB (2021) records for occurrences in the Planning Area

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Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
Bald eagle *Haliaeetus leucocephalus*	D/E, FP/–	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County.	In western North America, nests and roosts in coniferous forests within 1 mile of a lake, reservoir, stream, or the ocean.	Berry Creek, Forbestown, Gridley, Oroville Dam, Paradise East, Richardson Springs,
Northern harrier *Circus hudsonius*	–/SSC/–	Occurs throughout lowland California; has been recorded in fall at high elevations.	Grasslands, meadows, marshes, and seasonal and agricultural wetlands.	Biggs, Pennington, Sansborn Slough
Sharp-shinned hawk *Accipiter striatus*	–/WL/–	Permanent resident in the Sierra Nevada, Cascade, Klamath, and north Coast Ranges at mid elevations and along the coast in Marin, San Francisco, San Mateo, Santa Cruz, and Monterey Counties. Winters over the rest of the State except at very high elevations.	Dense canopy ponderosa pine or mixed-conifer forest and riparian habitats.	No CNDDB (2021) records for occurrences in the Planning Area
Cooper's hawk *Accipiter cooperii*	–/WL/–	Throughout California except high altitudes in the Sierra Nevada. Winters in the Central Valley, southeastern desert regions, and plains east of the Cascade Range.	Nests in a wide variety of habitat types, from riparian woodlands and digger pine-oak woodlands through mixed conifer forests.	No CNDDB (2021) records for occurrences in the Planning Area
Northern goshawk *Accipiter gentilis*	–/SSC/–	Permanent resident in the Klamath and Cascade Ranges, in the north Coast Ranges from Del Norte County to Mendocino County, and in the Sierra Nevada south to Kern County. Winters in Modoc, Lassen, Mono, and northern Inyo Counties.	Nests and roosts in older stands of red fir, Jeffrey pine, Ponderosa pine, lodgepole pine, Douglas fir, and mixed conifer forests.	Butte Meadows, Clipper Mills, Forbestown, Humboldt Peak, Jonesville, Kimshew Point, Onion Butte
Swainson's hawk *Buteo swainsoni*	–/T/CS	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County.	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields.	Biggs, Butte City, Chico, Foster Island, Glenn, Gridley, Honcut, Llano Seco, Loma Rica, Ord Ferry, Nelson, Nord, Palermo, Pennington, Richardson Springs NW, West of Biggs

TABLE 13-3 SPECIAL-STATUS WILDLIFE SPECIES DOCUMENTED OR IDENTIFIED AS HAVING THE POTENTIAL TO OCCUR IN THE PLANNING AREA

Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
Ferruginous hawk *Buteo regalis*	–/WL/–	Does not nest in California; winter visitor along the coast from Sonoma County to San Diego County, east-ward to the Sierra Nevada foothills and south-eastern deserts, the Inyo-White Mountains, the plains east of the Cascade Range, and Siskiyou County.	Open terrain in plains and foothills where ground squirrels and other prey are available.	No CNDDB (2021) records for occurrences in the Planning Area
Golden eagle *Aquila chrysaetos*	–/FP/–	Foothills and mountains throughout California. Uncommon nonbreeding visitor to lowlands such as the Central Valley.	Nest on cliffs and escarpments or in tall trees overlooking open country. Forages in annual grasslands, chaparral, and oak woodlands with plentiful medium and large-sized mammals.	No CNDDB (2021) records for occurrences in the Planning Area
Merlin (*Falco columbarius*)	–/WL/–	Breeds in Oregon, Washington north into Canada. Winters in southern Canada to South America, including California.	Breeds near forest openings, fragmented woodlots, and riparian areas. Wintering habitat includes wide variety, open forests, grasslands, tidal flats, plains, and urban settings.	West of Biggs
American peregrine falcon *Falco peregrinus anatum*	D/FP/–	Permanent resident along the north and south Coast Ranges. May summer in the Cascade and Klamath Ranges and through the Sierra Nevada to Madera County. Winters in the Central Valley south through the Transverse and Peninsular Ranges and the plains east of the Cascade Range.	Nests and roosts on protected ledges of high cliffs, usually adjacent to lakes, rivers, or marshes that support large prey populations.	Hamlin Canyon, Paradise West
California black rail *Laterallus jamaicensis coturniculus*	–/T, FP/CS	Permanent resident in the San Francisco Bay and east-ward through the Delta into Sacramento and San Joaquin Counties; small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside, and Imperial Counties.	Tidal salt marshes associated with heavy growth of pickleweed; also occurs in brackish marshes or freshwater marshes at low elevations.	Bangor, Cherokee, Hamlin Canyon, Loma Rica, Oroville, Paradise West, Palermo, Pennington, Richardson Springs, Sanborn Slough
Greater sandhill crane *Antigone canadensis tabida* (nesting and wintering)	–/T, FP/CS	Breeds in Siskiyou, Modoc, Lassen, Plumas, and Sierra Counties. Winters in the Central Valley, southern Imperial County, Lake Havasu National Wildlife Refuge, and the Colorado River Indian Reserve.	Summers in open terrain near shallow lakes or freshwater marshes. Winters in plains and valleys near bodies of fresh water.	Biggs, Gridley, Pennington, West of Biggs

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Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
Western yellow-billed cuckoo *Coccyzus americanus* (nesting)	T/E/CS	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers.	Wide, dense riparian forests with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley-oak riparian habitats where scrub jays are abundant.	Butte City, Foster Island, Glenn, Llano Seco, Ord Ferry, Sanborn Slough, West of Biggs
Western burrowing owl *Athene cunicularia*	–/SSC/CS	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast.	Level, open, dry, heavily grazed, or low stature grassland or desert vegetation with available burrows.	Biggs, Chico, Llano Seco, Nord, Richardson Springs
California spotted owl *Strix occidentalis occidentalis*	–/SSC/–	Sierra Nevada from Lassen County south to northern Kern County, and in the Transverse, Peninsular and southern coastal mountains.	Mature forest with suitable nesting trees. In southern California, occurs in oak and oak-conifer habitats in addition to mature conifer forest.	No CNDDB (2021) records for occurrences in the Planning Area
Black swift *Cypseloides niger* (nesting)	–/SSC/–	Breeds very locally in the Sierra Nevada and Cascade Range, the San Gabriel, San Bernardino, and San Jacinto mountains, and in coastal bluffs from San Mateo county south to near San Luis Obispo County.	Nests in moist crevice or cave on sea cliffs above the surf, or on cliffs behind, or adjacent to, waterfalls in deep canyons.	Brush Creek
Vaux's swift *Chaetura vauxi*	–/SSC/–	Coastal belt from Del Norte County south to Santa Cruz County and in mid-elevation forests of the Sierra Nevada and Cascade Range.	Nests in hollow, burned-out tree trunks in large conifers.	No CNDDB (2021) records for occurrences in the Planning Area
Willow flycatcher *Empidonax traillii*	–/E/–	Summers along the western Sierra Nevada from El Dorado to Madera County, in the Cascade and northern Sierra Nevada in Trinity, Shasta, Tehama, Butte, and Plumas Counties, and along the eastern Sierra Nevada from Lassen to Inyo County.	Riparian areas and large wet meadows with abundant willows. Usually found in riparian habitats during migration.	Jonesville

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Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
Bank swallow *Riparia riparia*	–/T/–	Occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American Rivers, in the Owens Valley; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou Counties. Small populations near the coast from San Francisco County to Monterey County.	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam.	Foster Island, Glenn, Gridley, Honcut, Llano Seco, Nord, Ord Ferry, Palermo, Vino
Loggerhead shrike *Lanius ludovicianus*	–/SSC/–	Resident and winter visitor in lowlands and foothills throughout California. Rare on coastal slope north of Mendocino County, occurring only in winter.	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	No CNDDB (2021) records for occurrences in the Planning Area
Least Bell's vireo *Vireo bellii pusillus*	E/E/–	In California, breeding range includes Ventura, Los Angeles, Riverside, Orange, San Diego, and San Bernardino Counties, and rarely Stanislaus and Santa Clara counties. Winters in southern Baja California Sur.	Nesting habitat includes dense, low shrubby vegetation in riparian areas, brushy fields, young second-growth woodland, scrub oak, coastal chaparral, and mesquite brushland.	Chico, Nelson, Shippee
Yellow warbler *Setophaga petechia*	–/SSC/–	Breeding range includes most of California, except Central Valley (isolated breeding locales on Valley floor, Stanislaus, Colusa, and Butte Counties), Sierra Nevada range above tree line, and southeastern deserts. Winters in Mexico south to South America.	Nesting habitat includes riparian vegetation near streams and meadows.	Shippee
Song sparrow ("Modesto" population) *Melospiza melodia*	–/SSC/–	Resident in central and southwest California, including Central Valley.	Nests in marsh, scrub habitat.	Sanborn Slough
Yellow-breasted chat *Icteria virens*	–/SSC/–	Nests locally in coastal mountains and Sierra Nevada foothills, east of the Cascades in northern California, along the Colorado river, and very locally inland in southern California.	Nests in dense riparian habitats dominated by willows, alders, Oregon ash, tall weeds, blackberry vines, and grapevines.	No CNDDB (2021) records for occurrences in the Planning Area

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Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
Tricolored blackbird *Agelaius tricolor*	–/T, SSC/CS	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties.	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields. Habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony.	Biggs, Butte City, Cherokee, Chico, Glenn, Gridley, Honcut, Llano Seco, Oroville, Nelson, Palermo, Pennington, Sanborn Slough, Shippee, West of Biggs
Mammals				
Western red bat *Lasiurus blossevillii*	–/SSC/–	Southern British Columbia in Canada, through Argentina and Chile in South America, including much of the western U.S.	Roosts in foliage of trees or shrubs; Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores).[c]	Ord Ferry, Stirling City, Strawberry Valley
Spotted bat *Euderma maculatum*	–/SSC/–	Occurs throughout eastern and southern California, the central Sierra Nevada, and the Sierra Nevada foothills bordering the San Joaquin Valley. One recent record from northern California in the Trinity Alps. Probably occurs in other portions of the State where habitat is suitable.	Found in a wide variety of habitats from low desert to high elevation coniferous forest, primarily in areas associated with cliff and canyon habitat. Females may favor ponderosa pine forests during reproduction.	No CNDDB (2021) records for occurrences in the Planning Area
Townsend's big-eared bat *Corynorhinus townsendii*	–/SSC/–	Throughout California from low desert to mid-elevation montane habitats.	Desert, oak woodland, coastal redwood, and mixed coniferous-deciduous forest. Day roosts in cave-like spaces including mines, caves, tunnels, and dark spaces in buildings, such as attics. May night roost in more open areas such as under bridges.	Oroville, Palermo

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Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
Pallid bat *Antrozous pallidus*	–/SSC/–	Occurs throughout California except the high Sierra from Shasta to Kern County and the northwest coast, primarily at lower and mid-elevations	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts.	Berry creek, Chico, Forbestown, Strawberry Valley
Western mastiff bat *Eumops perotis*	–/SSC/–	Occurs along the western Sierra primarily at low to mid elevations and widely distributed throughout the southern coast ranges. Recent surveys have detected the species north to the Oregon border.	Found in a wide variety of habitats from desert scrub to montane conifer. Roosts and breeds in deep, narrow rock crevices, but may also use crevices in trees, buildings, and tunnels.	Chico, Nord, Ord Ferry, Oroville, Palermo, Richardson Springs NW
Sierra Nevada mountain beaver *Aplodontia rufa californica*	–/SSC/–	Western and eastern slopes of the Sierra Nevada.	Riparian forest, riparian scrub, and riparian woodland Needs dense understory for food & cover. Burrows into soft soil. Needs abundant supply of water.	Cascade, Kimshew Point
Fisher- West Coast DPS (*Pekania pennanti*)	–/SSC/–	Canada and northern United States	Northern coniferous and mixed forests.	Brush Creek
Sierra Nevada snowshoe hare *Lepus americanus tahoensis*	–/SSC/–	Occurs in the Cascade mountains in Siskiyou and Del Norte Counties and the Sierra Nevada from Mt. Lassen south to Mono and Tulare Counties, generally between 4,800 and 8,000 feet.	Found in dense thickets of conifers, riparian vegetation, or chaparral in boreal life zones.	No CNDDB (2021) records for occurrences in the Planning Area
Sierra Nevada red fox *Vulpes vulpes necator*	C/T/–	Occurs in the Cascade Range, in Siskiyou County, and in the Sierra Nevada from Lassen County south to Tulare County.	Alpine dwarf-shrub, wet meadow, subalpine conifer, lodgepole pine, red fir, aspen, montane chaparral, montane riparian, mixed conifer, and ponderosa pine. In the Sierra Nevada, most sightings have been above 7,000 feet.	Butte Meadows, Jonesville
Pacific fisher *Martes pennanti*	E/T/–	Coastal mountains from Del Norte County to Sonoma Counties, east through the Cascades to Lassen County, and south in the Sierra Nevada to Kern County.	Late successional coniferous forests and montane riparian habitats.	Humboldt Peak, Jonesville

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Common and Scientific Name	Status[a] Federal/ State/HCP	Distribution	Preferred Habitats	USGS Quadrangles in the Planning Area Where Known Occurrences Have Been Documented[b]
American badger *Taxidea taxus*	–/SSC/–	Throughout California, except for the humid coastal forests of northwestern California in Del Norte and the northwestern Humboldt Counties.	Requires sufficient food, friable soils, and relatively open uncultivated ground; preferred habitat includes grasslands, savannas, and mountain meadows near timberline.	Butte City, Llano Seco, Nelson, West of Biggs.
California wolverine *Gulo gulo*	PT/T, FP/–	Klamath and Cascade Ranges south through the Sierra Nevada to Tulare County.	Found in a variety of mountain habitats. In north coastal areas, most sightings have been between 1,600 and 4,800 feet. The species has been found between 4,300 and 7,300 feet in the northern Sierra Nevada and between 6,400 and 10,800 in the Southern Sierra Nevada. Most common in open terrain above timberline and subalpine forests.	No CNDDB (2021) records for occurrences in the Planning Area

[a] Status explanations:
Federal
E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
C = candidate for threatened or endangered status.
PT = proposed for threatened status.
PD = proposed for delisting.
D = delisted.
– = no listing under the Federal Endangered Species Act
State
E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
FP = fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
WN = Wildlife Nursery Site
– = no listing under the California Endangered Species Act
Butte County Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP)
CS = Covered Species
– = no listing under the Butte County HCP/NCCP
[b] Known occurrences from California Natural Diversity Database 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. U.S. Fish and Wildlife Service. 2021. USFWS Resource Report List. Information for Planning and Conservation. Internet website: https://ecos.fws.gov/ipac/. Date accessed: February 2021.
Note: CNDDB = California Natural Diversity Database.
[c] Habitats from Western Bat Working Group. 2021. Western Bat Species Accounts. Accessed February 11, 2021. Available on-line at: http://wbwg.org/western-bat-species/

Red fir forest occurs between 6,000 and 9,000 feet in elevation and is generally dominated by red fir with few other species and little understory because of the dense shade and thick layer of dropped needles on the ground.

Subalpine conifer forest occurs at the highest elevations in the Planning Area. In the northern Sierra, this forest type is dominated by low-growing conifers, including mountain hemlock (*Tsuga mertensiana*), western white pine (*Pinus monticola*), lodgepole pine (*Pinus contorta* ssp. *murrayana*), and red fir. Understory is usually sparse, consisting of shrubs, grasses, and annuals.

Conifer forest provides habitat for numerous wildlife species. The large variety of plant species within conifer forest provides a diversity of food and cover for wildlife. Berries from deerbrush (*Ceanothus integerrimus*) and other shrubs and a variety of grasses and forbs provide essential resources for foraging wildlife. Mature forests are valuable habitat for cavity nesting birds.[14] Wildlife species that are common in this habitat type include Steller's jay (*Cyanocitta stelleri*), hairy woodpecker (*Dryobates villosus*), mountain chickadee (*Parus gambeli*), western gray squirrel (*Sciurus griseus*), porcupine (*Erethizon dorsatum*), gray fox (*Urocyon cinereoargenteus*), and blacktail deer (*Odocoileus hemionus*).[15]

Special-status wildlife species that may occur in this community type include northern goshawk (*Accipiter gentilis*) and California spotted owl (*Strix occidentalis occidentalis*).

Special-status wildlife species that may occur in this community type when it abuts reservoirs and drainages include osprey (*Pandion haliaetus*).

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[14] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[15] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1990a. *California Wildlife. Volume II: Birds*. California Department of Fish and Game. Sacramento, CA.

Three federally or state-listed species may occur within conifer forest in the Planning Area (Table 13-1): Sierra Nevada red fox (*Vulpes vulpes necator)*, Pacific fisher (*Pekania pennanti)*, and California wolverine (*Gulo gulo luteus*).[16] The state-listed bald eagle (*Haliaeetus leucocephalus)* may occur within conifer forests near large bodies of open water.

b. Oak Woodland

Oak woodland community types in the Planning Area include valley oak woodland, blue oak woodland, and blue oak–foothill pine. Oak woodlands are scattered throughout the Planning Area but are concentrated in the transition area between the lower valley and higher elevations of the Planning Area.

Valley oak woodland can vary from savannas of annual grasslands with few trees to dense stands of trees. This woodland is dominated by valley oak (*Quercus lobata*) but can have associates of western sycamore (*Platanus racemosa*), California black walnut (*Juglans californica* var. *hindsii*), interior live oak (*Quercus wislizenii*), box elder (*Acer negundo*), and blue oak (*Quercus douglasii*). Shrub species include California coffeeberry (*Rhamnus californica*), poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and blackberry (*Rubus* sp.). Annual grasses and forbs dominate the herbaceous layer.

Blue oak woodland occurs in the Sierra Nevada foothills and is dominated by blue oak with interior live oak and valley oak as associates. Dominant shrub species include manzanita (*Arctostaphylos* sp.), ceanothus (*Ceanothus* sp.), redberry (*Rhamnus crocea*), California coffeeberry, poison oak, and California buckeye (*Aesculus californica*).

The blue oak–foothill pine community is co-dominated by foothill pines (*Pinus sabiniana*) and blue oaks and occurs at slightly higher elevations than blue oak woodland. Other representative tree species include interior live oak, valley oak, and California buckeye. The understory of blue oak–foothill pine woodlands in the Planning Area contains several shrub species clumped together and interspersed with patches of annual grassland. Dominant shrub species include manzanita, ceanothus, redberry, California coffeeberry, poison oak, blue elderberry (*Sambucus nigra* ssp. *caerulea*), gooseberry (*Ribes* sp.), silver lupine (*Lupinus albifrons*), and western redbud (*Cercis occidentalis*).

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[16] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

Oak woodlands are important habitats because of their high value to wildlife in the form of nesting sites, cover, and food.[17] Birds associated with oak woodlands include acorn woodpeckers (*Melanerpes formicivorus*), Nuttall's woodpeckers (*Picoides nuttallii)*, California scrub jay (*Aphelocoma californica)*, yellow-billed magpie (*Pica nuttalli*), and many warblers and flycatchers. Cavities in oak trees are important nesting sites for American kestrel (*Falco sparverius*), tree swallow (*Tachycineta bicolor*), oak titmouse (*Baeolophus inornatus*), house wren (*Troglodytes aedon*), and western bluebird (*Sialia mexicana*). Tree cavities also provide important roosting habitat for some species of bats. Oak woodlands provide nesting sites for raptors, such as red-tailed hawks (*Buteo jamaicesis*), red-shouldered hawks (*Buteo lineatus*), and great horned owls (*Bubo virginianus*).[18] Mammals associated with woodlands include western gray squirrel, pallid bat (*Antrozous pallidus*), bobcat (*Lynx rufus*), blacktail deer, and gray fox.[19] Acorns are an important food source for species such as California quail (*Callipepla californica*), wild turkey (*Meleagris gallopavo*), western gray squirrel, and blacktail deer.[20]

Special-status wildlife species that may occur in this community type include western spadefoot (*Spea hammondii*), Cooper's hawk (*Accipiter cooperii*), golden eagle, and Townsend's big-eared bat (*Corynorhinus townsendii*).

Two federally or state-listed species may occur within oak woodland in the Planning Area (Table 13-1): Valley elderberry longhorn beetle and Swainson's hawk (*Buteo swainsoni*).[21]

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[17] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[18] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1990a. *California Wildlife. Volume II: Birds*. California Department of Fish and Game. Sacramento, CA.

[19] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1990b. *California Wildlife. Volume III: Mammals*. California Department of Fish and Game. Sacramento, CA.

[20] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[21] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

Oak woodland is a common habitat locally and regionally and in most instances is not considered by CDFW to be a sensitive natural community; however, native oak trees and woodland habitats are declining statewide because of development and land management practices. For this reason, oak woodlands in the Planning Area should be considered in the context of the Butte County Oak Woodlands Management Plan Resolution.

c. Riparian Woodland

Riparian woodland occurs throughout the Planning Area along portions of the Feather River, Thermalito Afterbay and Forebay, and Thermalito Diversion Pool, and along numerous smaller perennial and ephemeral drainages. Riparian woodlands also commonly are associated with dredge tailings. Riparian woodlands in the Planning Area are typically dominated by a mixture of trees and shrubs, including Fremont cottonwood (*Populus fremontii*), valley oak, Oregon ash (*Fraxinus latifolia*), Himalayan blackberry (*Rubus armeniacus*), and a variety of willows (*Salix* sp.).

Because the vegetation is diverse and well developed, riparian forest provides high-value habitat for wildlife, including several special-status species. Riparian forest habitat provides food, water, and migration and dispersal corridors, as well as escape, nesting, and thermal cover for many wildlife species.[22] Invertebrates, amphibians, and aquatic reptiles live in aquatic and adjacent upland habitats. Raptors, herons, egrets, and other birds nest in the upper canopy. Various songbirds use the shrub canopy, and cavity-nesting birds, such as Nuttall's woodpecker and oak titmouse, occupy dying trees and snags.[23] Several mammals, including raccoons (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and striped skunks (*Mephitis mephitis*) are common in riparian habitats.[24]

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[22] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California.* October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[23] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1990a. *California Wildlife. Volume II: Birds.* California Department of Fish and Game. Sacramento, CA.

[24] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1990b. *California Wildlife. Volume III: Mammals.* California Department of Fish and Game. Sacramento, CA.

Riparian woodlands also provide nesting habitat for several special-status raptors, including osprey, Cooper's hawk, and white-tailed kite. Cavities within riparian trees along waterways in the Planning Area may be used as roosting sites by some species of special-status bats, such as the pallid bat (*Antrozous pallidus*).

Riparian habitats are considered sensitive natural communities and should be given special consideration in the Planning Area because they provide several important ecological functions, including streambank stabilization, water quality maintenance, and essential habitat for wildlife and fisheries resources.

Six federally or state-listed species may occur within riparian woodland in the Planning Area (Table 13-1): valley elderberry longhorn beetle, bald eagle, Swainson's hawk, least Bell's vireo, willow flycatcher (*Empidonax traillii*), and western yellow-billed cuckoo.[25] Western yellow-billed cuckoos could nest in very dense areas of riparian woodland along the Feather River.

d. Chaparral

Chaparral occurs on foothill slopes, within the understory of woodlands, and at higher elevations of the Planning Area. This community is adapted to wildfires and at lower elevations is dominated by common manzanita, whiteleaf manzanita (*Arctostaphylos viscida*), and scrub oak (*Quercus berberidifolia*) with associate species such as toyon, California buckeye, and poison oak. At higher elevations, whiteleaf manzanita may be the only dominant shrub, and it often occurs on serpentine or gabbro substrates. Chaparral also provides suitable habitat for many special-status plant species listed in Table 13-2.

Chaparral provides habitat for a variety of birds and mammals. Numerous rodents, deer, and other herbivores are common in chaparral communities. Montane chaparral provides important summer range foraging areas, escape cover, and fawning habitat for deer. Rabbits and hares will eat twigs, evergreen leaves, and bark from chaparral in fall and winter when there is not an abundance of grasses. Shrubby vegetation provides mammals with shade during hot weather and protection from wind in the winter. Chaparral provides seeds, fruits, insects, and protection from predators and the weather in addition to singing, roosting, and

[25] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

nesting sites for many species of birds.[26] Sagebrush lizard (*Sceloporus graciosus*), California quail (*Callipepla californica*), Bewick's wren (*Thryomanes bewickii*), wrentit (*Chamaea fasciata*), brush mouse (*Peromyscus boylii*), and black-tailed deer are common in chaparral habitats.[27]

Special-status wildlife species that may occur in chaparral habitat include Blainsville's horned lizard (*Phrynosoma blainvillii*) at lower elevations and Sierra Nevada snowshoe hare (*Lepus americanus tahoensis*) at upper elevations.[28]

One federally and state-listed species may occur within chaparral habitat in the Planning Area (Table 13-1): Layne's ragwort (*Packera layneae*).[29]

Mixed chaparral is a common habitat regionally and in most instances is not considered by the CDFW to be a sensitive natural community.

e. Annual Grassland

Annual grasslands occur throughout the Planning Area. Large, open areas of annual grasslands occur primarily in the central portion of the Planning Area and are typically grazing pastures for livestock. Annual grasslands also form the understory for oak woodland and occur as vacant parcels in developed areas. Annual grasslands in the Planning Area are dominated by nonnative annual grasses with intermixed annual and perennial forbs, including wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), fescue (*Festuca* sp.), clover (*Trifolium variegatum*), wild mustard (*Brassica* sp.), and wild radish (*Raphanus raphanistrum*).

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[26] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[27] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1988. *California Wildlife. Volume I: Amphibians and Reptiles*. California Department of Fish and Game. Sacramento, CA.

[28] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1990b. *California Wildlife. Volume III: Mammals*. California Department of Fish and Game. Sacramento, CA.

[29] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

Annual grasslands are used by many wildlife species for foraging. Some of these species also breed in annual grassland if special habitat features such as cliffs, caves, ponds, or woody plants are available for breeding or resting or as escape cover. Reptiles that breed in annual grassland habitats include western fence lizards (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), and Northern Pacific rattlesnake (*Crotalus oreganus oreganus*). Grasslands provide foraging habitat for wide-ranging species such as red-tailed hawk, turkey vulture (*Cathartes aura*), American kestrel, and northern harrier (*Circus cyaneus*). Mammals typically found in this habitat include California vole (*Microtus californicus*), western harvest mouse (*Reithrodontomys megalotis*), California ground squirrel, black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*).[30] In addition, many species that nest or roost in adjacent woodlands may forage in grasslands, including western bluebird, western kingbird (*Tyrannus verticalis*), and some species of bats.

Special-status wildlife species that could breed or nest within annual grasslands in the Planning Area include Blainsville's horned lizard, northern harriers, western burrowing owls (*Athene cunicularia*), and American badgers (*Taxidea taxus*). Annual grasslands also provide important foraging habitat for special-status resident and wintering birds, including ferruginous hawk (*Buteo regalis*), merlin (*Falco columbarius*), northern harrier, golden eagle, and loggerhead shrike (*Lanius ludovicianus*).

One federally and state-listed species may occur within annual grassland in the Planning Area (Table 13-1): Swainson's hawk.[31]

Annual grassland is a common habitat locally and regionally and in most instances is not considered by CDFW to be a sensitive natural community.

[30] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[31] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

f. Open Water

Open water communities in the Planning Area include several large reservoirs, numerous small ponds throughout agricultural areas, and riverine habitats in perennial and ephemeral drainages. Most of these areas are regulated under the jurisdiction of the Corps and the RWQCB.

i. Reservoirs

There are many reservoirs in Butte County. Some of the larger reservoirs include Lake Oroville, Thermalito Forebay and Afterbay, and Sly Creek Reservoir. The largest reservoirs in the county are Lake Oroville and Thermalito Forebay and Afterbay, located on the Feather River. They are discussed in more detail below. Sly Creek Reservoir is currently stocked with rainbow trout (*Oncorhynchus mykiss*) and has previously been stocked with brown trout (*Salmo trutta*) and kokanee salmon (*Oncorhynchus nerka*).[32,33] Most of these lakes provide recreational opportunities in the county.

The Thermalito Afterbay and Thermalito Forebay are large reservoirs located on the Feather River that were formed by earthen dams. These facilities are part of a larger Oroville Water Storage System that was created by the State Water Project for purposes of water storage and delivery. These features also provide hydroelectric power outside of the Planning Area. The Oroville Reservoir (also known as Lake Oroville) located northeast of Oroville is the principal water storage facility of the State Water Project, which conserves and delivers water to over two-thirds of California's population.

The Thermalito Afterbay and Thermalito Forebay provide important resting and foraging habitat for migratory waterfowl traveling along the Pacific Flyway. The Thermalito Afterbay is part of the larger Oroville Wildlife Area (shown in Figure 13-1). The eastern portion of the preserve surrounding the Feather River contains numerous dredge tailings and borrow pits. These areas support riparian woodlands, freshwater marsh, and open water habitats. More than 170 species of resident and migratory birds use this area, in addition to mammals such as river

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[32] NorCAlFishReports.com, 2021. Sly Creek Reservoir – Strawberry Valley, CA. Available: < https://www.norcalfishreports.com/lakes/1885/sly-creek-reservoir.php>. Accessed: February 12, 2021.

[33] USDA Forest Service. Plumas National Forest: Sly Creek Recreation Area. Available: <https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5360743.pdf>. Accessed: February 12, 2021.

otter (*Lutra canadensis*), beaver (*Castor canadensis*), raccoon, and muskrat (*Ondatra zibethicus*). A known heron rookery is also present within the Oroville Wildlife Area along Larkin Road. Thermalito Forebay is managed by the CDFW as a put-and-take fishery of 0.5-pound rainbow and brook trout, with small numbers of warmwater fish. Because Thermalito Afterbay connects with the Forebay, some trout migrate into this area. However, the primary fishery is largemouth bass.[34]

ii. Ponds

Ponds are one type of lacustrine habitat that include areas of shallow open water, although areas of rooted freshwater marsh or floating plants may occur within this habitat. Ponds may be naturally occurring or manmade for stock and other uses.

iii. Drainages

Perennial and ephemeral drainages occur throughout the Planning Area. These drainages typically are associated with riparian habitat described above and may support areas of freshwater marsh. Primary drainages within the Planning Area include the Sacramento River, Feather River, Butte Creek, and Little Chico Creek. The fisheries for these major drainages are described below.

One state-listed species may occur within drainages of the Planning Area (Table 13-1): Bank swallow (*Riparia riparia*), as it will dig nesting holes in vertical banks along rivers.[35]

a) Sacramento River

The Sacramento River forms Butte County's western border and is California's largest river. The Sacramento River watershed benefits from a large snowpack, which supports flow throughout the spring and early summer. The Sacramento watershed contains Lake Shasta and Lake Oroville, the two largest reservoirs in California, which are major features of the federal Central Valley Project and State Water Project, respectively. The Sacramento River conveys two-thirds of California's water via the Central Valley and State Water Projects.

[34] Department of Water Resources, 2001. State of California. Initial Information Package. Relicensing of the Oroville facilities.

[35] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

Several wildlife areas/refuges exist along the Sacramento River (see the "Important Wildlife Areas" section). In addition, the State Legislature passed SB 1086 in 1986, which called for a management plan for the Sacramento River and its tributaries that would protect, restore, and enhance both fisheries and riparian habitat.[36] As a result of SB 1086, in 2001, the Department of Water Resources developed the Sacramento River Conservation Area Handbook, which set forth a management program for the Sacramento River Conservation Area. The overall goal of the management program for the Sacramento River Conservation Area (SB 1086) is to preserve remaining riparian habitat and reestablish a continuous riparian ecosystem along the Sacramento River between Redding and Chico and to reestablish riparian vegetation along the river from Chico to Verona. Since the development of the management program, "many of the fisheries action items have been, or are currently being implemented, such as fish bypass structures at diversions on Sacramento River tributaries and the Shasta Dam temperature control structure."[37]

Within the Planning Area, common fish species expected to occur in the Sacramento River include Sacramento sucker (*Catostomus occidentalis*), Sacramento pikeminnow (*Ptychocheilus grandis*), hardhead (*Mylopharodon conocephalus*), hitch (*Lavinia exilicauda*), threespine stickleback (*Gasterosteus aculeatus*), and tule perch (*Hysterocarpus traskii*), in addition to introduced species. Special-status fish species that occur in the Sacramento River include fall/late fall-run Chinook salmon and hardhead. River lamprey (*Lampetra ayresii*) may occur in the Sacramento River also.

Four of the five federally and state-listed fish species have known occurrences within the Sacramento River portion of the Planning Area (Table 13-1): Sacramento River winter-run ESU Chinook salmon, Central Valley spring-run ESU Chinook salmon, North American green sturgeon, and California Central Valley DPS steelhead.[38] Delta smelt do not occur within the county or

[36] Sacramento River Conservation Area Forum Handbook, 2003. Available: https://www.sacramentoriver.org/forum/index.php?id=handbook. Accessed February 12, 2021.

[37] Sacramento River Conservation Area Forum Handbook, 2003. Available: https://www.sacramentoriver.org/forum/index.php?id=handbook. Accessed February 12, 2021.

[38] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

Planning Area; however, they occur further downstream in the Sacramento River and thus have potential to occur within the Planning Area.

b) Feather River

The Feather River watershed drains more than 3,200 square miles of land from the crest of the Sierras west to the Sacramento River. The watershed has a wide variety of terrain, climate, and plant and animal species. Vegetation communities include mixed conifer, deciduous riparian forests, and alluvial meadows. The lower watershed is characterized by intense human use (from agriculture, urbanization, and recreation, etc.).[39]

The Feather River supports a diverse assemblage of native and nonnative species. Anadromous and other migratory species include state sensitive Central Valley fall-run Chinook salmon, federally and state-listed Central Valley spring-run Chinook salmon, federally listed Central Valley steelhead, white sturgeon (*Acipenser transmontanus*), federally listed green sturgeon, Pacific lamprey (*Lampetra tridentata*), striped bass (*Morone saxatilis*), and American shad (*Alosa sapidissima*). Also, the Feather River hatchery produces and releases fall- and spring-run Chinook salmon and steelhead into the Feather River and the Sacramento-San Joaquin River Delta. Native resident freshwater fish present in the Feather River include state sensitive hardhead, speckled dace (*Rhinichthys osculus*), California roach (*Lavinia symmetricus*), Sacramento sucker, and Sacramento pikeminnow. Nonnative fish species, such as carp (*Cyprinus carpio*), mosquitofish (*Gambusia affinis*), smallmouth bass (*Micropterus dolomieu*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), and redear sunfish (*L. microlophus*), are also present.[40]

The Feather River salmon and steelhead hatchery is in the City of Oroville and operated by the CDFW. The hatchery was constructed in 1967 to mitigate the loss of salmonid habitat due to the construction of Oroville Dam. Records dating back to 1960 show that the spring-run Chinook salmon return ranged from approximately 146 (1967) to 8,662 (2003) fish, while fall-run Chinook

[39] Lower Feather River Watershed Consolidated Resource Management, no date. Feather River Watershed. Available: <Feather_LowerFeather.pdf (sacriver.org)>. Accessed: February 12, 2021.

[40] Jones & Stokes. 2004. *Bear River and Western Pacific Interceptor Canal Levee Improvements Project; Draft environmental impact report.* Final. August. (J & S 04-023.) Sacramento, CA. State Clearinghouse No. 2004032118.

salmon returns ranged from 4,487 (2009) to 178,645 (2001).[41] Steelhead returns during the period from 2000 to 2009 ranged from 45 (2009) to 1,712 (2003) fish.[42] Fish numbers vary from year to year, but the overall trend from 1981 to 1991 showed an increasing trend from an average of 39,000 to 51,000 fall-/late-fall-run Chinook salmon per year.[43] Annual estimates of spring-run ESU escapement for the Feather River basin ranged from approximately 146 (1967) to 8,662 (2003) and was last estimated to be 2,110 in 2018.[44] Annual estimates of fall-run escapement (hatchery and in-river combined) for the Feather River basin ranged from approximately 6,126 fish in 1990 to 203,515 fish in 2001 and was last estimated at 79,070 fish in 2019.[45]

c) Butte Creek

Butte Creek supports the largest remaining run of wild spring-run Chinook salmon in California. Additionally, this creek and its tributaries also support small populations of steelhead trout and late-fall-run Chinook salmon. Annual counts of Chinook salmon since 1960 ranged from 10 to 11,470 spring-run Chinook salmon and 0 to 4,433 fall-run Chinook salmon.[46]

Problems in Butte Creek include inadequate fish passage over diversion dams, unblocked drains that attract and strand fish, and poor water quality. Areas of Upper Butte Creek have water temperatures above tolerance levels for salmonids, which can result in mortality of over-summering adults, a situation

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[41] GrandTab. 2020. 2020.05.22: California Central Valley Chinook Population Database Report. Fisheries Branch, Anadromous Resources Assessment. May 22, 2020.

[42] California Hatchery Review Project. 2012. *Feather River Hatchery Steelhead Program*. Available <http://cahatcheryreview.com/wp-content/uploads/2012/08/Feather%20Steelhead%20Program%20Report%20June%202012.pdf>. Accessed February 2021.

[43] California Department of Fish and Game, 2005. Feather River Hatchery. Weekly anadromous fish count. For week: 2/27/2005 to 3/5/2005. Available: < http://www.dfg.ca.gov/hatcheries/feather-river/fish-counts/20050227.pdf>. Accessed: January 22, 2007.

[44] GrandTab. 2020. California Central Valley Chinook Population Database Report. Fisheries Branch, Anadromous Resources Assessment. May 22, 2020.

45 GrandTab. 2020. California Central Valley Chinook Population Database Report. Fisheries Branch, Anadromous Resources Assessment. May 22, 2020.

[46] GrandTab 2020. California Central Valley Chinook Population Database Report. Fisheries Branch, Anadromous Resources Assessment. May 22, 2020.

that was observed in 2002, 2003, and 2013.[47] Numerous fishery restoration projects were implemented in Butte Creek between 1993 and 2005 through the collaboration of many organizations.[48]

d) Big Chico Creek

Big Chico Creek supports small, non-sustaining populations of spring-run Chinook salmon in some years. In addition, there is evidence of small populations of steelhead trout and late fall-run salmon occurring within this creek. Annual counts of Chinook salmon since 1960 ranged from 0 to approximately 500 spring-run Chinook salmon and 0 to 500 fall-run Chinook salmon; however, the last fall-run estimate was made in 1985.[49] Historically, state sensitive fall-run Chinook salmon were the main salmonid species in Big Chico Creek, but they have declined since, and a remnant population may remain. Federally listed Central Valley DPS steelhead trout also have decreased to low populations in this waterway. The decline of these populations is attributed to a lack of access to the upper watershed due to the shifting of massive boulders at Salmon Hole in Upper Bidwell Park and a broken fish ladder. Additional hardships for migratory fish include intermittent flows in Lindo Channel, poor fish passage at the One Mile Recreation Area of Bidwell Park, and inadequate fish passage at the Five-Mile Culvert Dam and Iron Canyon. Although excellent spawning gravels are available in Lindo Channel, inconsistent flows prevent successful spawning in most years. CDFW has completed the major portion of a plan to restore the anadromous fishery of Big Chico Creek.[50]

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[47] Garman, Clint E., 2013. *Butte Creek Spring-Run Chinook Salmon, Oncorhynchus Tshawytscha Pre-Spawn Mortality Evaluation.* (Inland Fisheries Administrative Report 2014–1.) Available: < http://www.buttecreek.org/documents/Report%20_FNL_2013.pdf >. Accessed: February 12, 2021.

[48] CDFG. Butte Creek Anadromous Fish Restoration Handout. 2005. California Department of Fish and Game and CALFED. http://www.buttecreek.org/documents/ButteCreekAnadromousFishRestoration.pdf>. Accessed: February 12, 2021.

[49] GrandTab 2020. 2020.05.22: California Central Valley Chinook Population Database Report. Fisheries Branch, Anadromous Resources Assessment. May 22, 2020.

[50] Big Chico Creek. 2020. *2020 Fish Population Study.* Available: < https://www.csuchico.edu/bccer/_assets/documents/2020bccsnorkelsurvey.pdf >. Accessed: February 12, 2021.

Numerous creeks also occur in the Planning Area, from the higher elevation areas down into the lower valley area, where the major creeks occur and drain to the rivers. The Planning Area also includes manmade canals, such as the Western Canal, Cherokee Canal, and Main Drainage Canal, and irrigation ditches. Open water and riverine habitat provide habitat for a variety of wildlife. Birds such as herons and belted kingfishers (*Ceryle alcyon*) forage in these communities, primarily along the water's edge. Many species of insectivorous birds (e.g., swallows, swifts, and flycatchers) catch their prey over open water. Mammals that can be found in and along riverine habitat include river otter, muskrat, beaver, and raccoon.

Special-status wildlife species that could occur within perennial and ephemeral drainages in the Planning Area include foothill yellow-legged frog (Feather River clade; *Rana boylii*) and northwestern pond turtle (*Actinemys marmorata*). These species have been recorded within the Planning Area and are presumed extant.[51]

Four federally or state-listed species may occur within perennial and ephemeral drainages in the Planning Area (Table 13-1): California red-legged frog, Sierra Nevada yellow-legged frog (*Rana sierrae*), Cascades frog (*Rana cascadae*), and willow flycatcher.[52] There is designated critical habitat for California red-legged frog within the Planning Area.

Drainages are considered *other waters of the United States* by the Corps and are regulated by the Corps, RWQCB, CDFW, and USFWS.

g. Wetlands

Wetlands are regulated by several resource agencies. Some wetland habitats are considered by CDFW to be sensitive natural communities but all should be given special consideration in the Planning Area because they provide a variety of important ecological functions and essential habitat for wildlife resources. Natural wetland habitats are steadily declining compared to their historical distribution, as a result of land management practices and development activities. The Corps,

[51] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

[52] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

RWQCB, CDFW, and the USFWS have policies and regulations that protect wetland habitats.

Three main categories of wetlands occur in the Planning Area: freshwater marsh, wet meadow, and vernal pool. Each of these wetland types is described below.

i. Freshwater Marsh

Freshwater marsh occurs along the margins of drainages and open water habitats in the Planning Area. Flooded rice fields in the Planning Area also support patches of freshwater marsh. Characteristic vegetation within freshwater marsh includes cattails (*Typha* sp.), rushes (*Juncus* sp.), and sedges (*Carex* sp.).

Freshwater marsh is among the most productive wildlife habitats in the State. Vegetation associated with freshwater marsh provides foraging, nesting, and refuge habitat for numerous wildlife species that also occur in the adjacent open water.[53] Common wildlife that is expected to occur in freshwater marsh habitats within the Planning Area include Sierran tree frog (*Pseudacris sierra*), common garter snake, great egret (*Ardea alba*), great blue heron (*Ardea herodias*), red-winged blackbird (*Agelaius phoeniceus*), and song sparrow (*Melospiza melodia*).[54]

In the Planning Area, special-status wildlife species such as northwestern pond turtle, northern harrier, and song sparrow may nest, take cover, and forage within freshwater marsh vegetation, in drainages and irrigation canals.

Three federally or state-listed species that may occur within freshwater marsh in the Planning Area (Table 13-1): California red-legged frog, giant garter snake, and California black rail.[55] There is designated critical habitat for California red-legged frog within the Planning Area.

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[53] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[54] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1988. *California Wildlife. Volume I: Amphibians and Reptiles.* California Department of Fish and Game. Sacramento, CA.

[55] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

ii. Wet Meadow

Wet meadow habitat occurs at higher elevations in the eastern portion of the Planning Area. Dominant species in wet meadows include herbaceous wetland plants such as sedges, rushes, spikerush (*Eleocharis* spp.), bent grass (*Agrostis* spp.), and oatgrass (*Danthonia* spp.). There are generally sparse or no shrubs or trees in wet meadows. Special-status plants associated with wet meadow habitat include Ferris' milk vetch (*Astragalus tener* var. *ferrisiae*), resin birch (*Betula glandulosa*), scalloped moonwort (*Botrychium ascendens*), thread-leaved beakseed (*Bulbostylis capillaris*), Butte County calycadenia (*Calycadenia oppositifolia*), Sierra arching sedge (*Carex cyrtostachya*), shore sedge (*Carex limosa*), marsh claytonia (*Claytonia palustris*), California pitcherplant (*Darlingtonia californica*), English sundew (*Drosera anglica*), slender cottongrass (*Eriophorum gracile*), fern-leaved monkeyflower (*Erythranthe filicifolia*), California satintail (*Imperata brevifolia*), three-ranked hump moss (*Meesia triquetra*), broad-nerved hump moss (*Meesia uliginosa*), tall alpine-aster (*Oreostemma elatum*), California alkali grass (*Puccinellia simplex*), alder buckthorn (*Rhamnus alnifolia*), California beaked-rush (*Rhynchospora californica*), giant checkerbloom (*Sidalcea gigantea*), long-leaved starwort (*Stellaria longifolia*), and flat-leaved bladderwort (*Utricularia minor*).

Wet meadows provide sources of drinking water for deer and other mammals and various species of birds. Deer and elk (*Cervus canadensis*) also may feed on forbs and grasses in wet meadows. Open areas of water, such as pools and streams, may be occupied by trout and waterfowl. If dense vegetation is present within the meadow, certain species of birds, such as yellow-headed (*Xanthocephalus xanthocephalus*) and red-winged blackbirds, may nest in these areas.[56] Amphibians such as Sierran tree frogs, western toads (*Bufo boreas*), Sierra Nevada yellow-legged frogs, and long-toed salamander (*Ambystoma macrodactylum*) may occur in wet meadows.[57] If the meadow dries in the summer, small mammals may forage in the grasses in this area.[58]

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[56] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[57] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1988. *California Wildlife. Volume I: Amphibians and Reptiles*. California Department of Fish and Game. Sacramento, CA.

[58] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats

Wet meadows in the Planning Area may provide suitable habitat for special-status wildlife species including northwestern pond turtle.

Three federally or state-listed species may occur within wet meadow in the Planning Area (Table 13-1): Cascades frog, Sierra Nevada yellow-legged frog, and tricolored blackbird (*Agelaius tricolor*).[59]

iii. Vernal Pool

Vernal pools occur primarily in the central portion of the Planning Area. A large area of vernal pools is located north and south of Cottonwood Road between Highways 99 and 70; these pools are northern volcanic mud-flow vernal pools. Vernal pools in the Planning Area occur within annual grasslands and represent a variety of pool types, including northern hardpan and northern volcanic mud-flow pools. Representative plant species observed within these pools includes hairgrass (*Eleocharis* sp.), coyote thistle (*Eryngium* sp.), navarretia (N*avarretia* sp.), slender woollyheads (*Psilocarphus tenellus*), and calicoflower (*Downingia* sp.).

Amphibians such as Pacific tree frogs and western toads use vernal pools and seasonal swales for breeding. Insect larvae and aquatic invertebrates commonly occur in vernal pools and provide a valuable food source for amphibians as well the many birds that overwinter in or migrate through the Planning Area. Larger vernal pools and seasonal swales provide foraging habitat for a number of bird species, including killdeer (*Charadrius vociferus*), greater yellowlegs (*Tringa melanoleuca*), great egret (*Ardea alba*), and black-necked stilt (*Himantopus mexicanus*).

Vernal pools provide habitat for several special-status species, including Henderson's bent grass (*Agrostis hendersonii*), brittlescale (*Atriplex depressa*), subtle orache (*Atriplex subtilis*), valley brodiaea (*Brodiaea rosea* ssp. *vallicola*), pappose tarplant (*Centromadia parryi* ssp. *rudis*), hogwallow starfish (*Hesperevax caulescens*), Ahart's dwarf rush (*Juncus leiospermus* var. *aharti*), Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*), Ferris' goldfields (*Lasthenia ferrisiae*), woolly meadowfoam (*Limnanthes floccosa* ssp. *floccosa*), Tehama navarretia (*Navarretia nigelliformis* ssp. *nigelliformis*), California adder's-tongue (*Ophioglossum californicum*), Ahart's parinychia

- California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[59] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

(*Paronychia ahartii*), California alkali grass (*Puccinellia simplex*), Butte County golden clover (*Trifolium jokerstii*, and western spadefoot toad (*Spea hammondii*). Western spadefoot toad has been reported in 12 locations in Butte County.[60]

Seven federally or state-listed species dependent on vernal pools are recorded as occurring within and have designated critical habitat within the Planning Area (Table 13-1): Hoover's spurge (*Euphorbia hooveri*), Butte County meadowfoam, hairy Orcutt grass, Greene's tuctoria, conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp.[61] Forty-three and 38 occurrences of vernal pool fairy shrimp and vernal pool tadpole shrimp, respectively, have been reported to the CNDDB in Butte County.[62]

h. Agricultural Land

Areas used for agriculture are scattered throughout the western half of the Planning Area. Within the Planning Area, the three most land-intensive crops in the county (rice, almonds, and English walnuts) occupy over one-third of the available agricultural acreage.[63] Other important crops include kiwi fruit, dried plums (prunes), peaches, and olives.

Agricultural lands are established on fertile soils that historically supported abundant wildlife. The quality of habitat for wildlife is greatly diminished when the land is converted to agricultural uses and is intensively managed. Many species of rodents and birds have adapted to agricultural lands, but they are often controlled by fencing, trapping, and poisoning to prevent excessive crop losses.[64] However,

[60] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

[61] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

[62] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

[63] Butte County Agricultural Commissioner, September 29, 2020, 2019 Butte County Agricultural Crop Report available at Crop Reports (buttecounty.net).

[64] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

depending on the crop pattern and the proximity to native habitats, row crops and rice fields can provide relatively high-value habitat for wildlife, particularly as foraging habitat. Raptor species use row- and grain-crop agricultural lands for foraging because several species of common rodents are found in agricultural fields. Rice fields and fallow agricultural fields provide important foraging and resting habitat for migrating and wintering waterfowl and shorebirds. Wildlife species associated with agricultural lands include mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), Brewer's blackbird (*Euphagus cyanocephalus*), various raptor species, egrets, and many species of rodents.[65]

Special-status wildlife species associated with agricultural lands, such as the northern harrier, may use adjacent irrigation canals and freshwater marsh vegetation for foraging or breeding.

Three federally or state-listed species may forage within agricultural land in the Planning Area (Table 13-1): Giant garter snake, Swainson's hawk, and greater sandhill crane (*Grus canadensis*).[66] Giant garter snakes have the potential to occur in irrigation canals and can also use the adjacent agricultural lands as basking habitat.

i. Barren Land

Barren land is unvegetated and may include areas of vertical riverbanks of loose soil at lower elevations and exposed rock in alpine areas above the tree line or between high-elevation conifer forests. Urban areas also may include barren land with large expanses of pavement or buildings where there is little or no vegetation.

Because of the lack of vegetation, barren ground has a limited use by wildlife. However, some species, such as western burrowing owl, prefer areas with limited or very low-growing vegetation.

[65] Zeiner, D.C., F. Laudenslayer, K.E. Mayer, and M. White., 1990a. *California Wildlife. Volume II: Birds.* California Department of Fish and Game. Sacramento, CA.

[66] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

j. Urban Areas

Urbanized portions of the Planning Area include Chico, Paradise, Oroville, Biggs, and Gridley, as well as other smaller unincorporated communities. Biological communities in these areas are relatively limited and support a predominance of horticultural plant species rather than native species.

Urban areas generally have a lower value for wildlife because of human disturbance and a lack of vegetation. Wildlife species that use these areas are typically adapted to human disturbance.[67] However, more densely vegetated "urban forests" can provide habitat for songbirds and some raptor species. Wildlife species associated with urban residential and suburban areas include western fence lizard, California scrub jay, northern mockingbird (*Mimus polyglottos*), house finch (*Carpodacus mexicanus*), rock pigeon (*Columba livia*), fox squirrel (*Sciurus niger*), raccoon, opossum, and striped skunk.[68]

2. Special-Status Species

Special-status species are plants and animals that are legally protected under the State or federal ESA or other regulations, and species that are considered by the scientific community to be sufficiently rare to qualify for such listing. Special-status plants and animals are species in the following categories:

- Listed, proposed for listing, or candidates for future listing as threatened or endangered under the federal ESA;
- Listed or candidates for future listing as threatened or endangered under the California ESA;
- Meet the definitions of endangered or rare under Section 15380 of the CEQA Guidelines;

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[67] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

[68] Mayer, K.E. and W.F. Laudenslayer, Jr., 1988. *A Guide to Wildlife Habitats of California*. October. Sacramento, CA: California Department of Forestry and Fire Protection. The entire original publication is available online with updates (Wildlife Habitats - California Wildlife Habitat Relationships System, < https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>).

- ♦ Identified as a Species of Special Concern (SSC) by the CDFW;
- ♦ Plants considered by CNPS to be "rare, threatened, or endangered in California" (California Rare Plant Rank [CRPR] 1 and 2);
- ♦ Plants listed by CNPS as species about which more information is needed to determine their status (CRPR 3) and plants of limited distribution (CRPR 4);
- ♦ Plants listed as rare under the California Native Plant Protection Act (NPPA, California Fish and Game Code, Section 1900 et seq.); or
- ♦ Are fully protected in California in accordance with the California Fish and Game Code, Sections 3511 (birds), 4700 (mammals), 5050 (amphibians and reptiles), and 5515 (fishes).

The sections below discuss the available information regarding special-status plants, wildlife, and fish known to occur or with potential to occur in the Planning Area.

In preparing the following sections, the *Ecological Baseline Conditions Report for the Butte Regional HCP/NCCP*[69] (Baseline Report) was reviewed to ensure that the covered species in the HCP/NCCP were included in this report. The Butte Regional HCP/NCCP Planning Area includes a 564,203-acre area in the western lowlands and foothills of Butte County.

a. Special-Status Plants

In the Planning Area, 130 special-status plants were identified as potentially occurring or documented in the CNDDB and CNPS Rare Plant Program as occurring (Table 13-2).[70,71] Of these species, five species (Hoover's spurge, Butte County meadowfoam, hairy Orcutt grass, Greene's tuctoria, and Layne's ragwort) are federally or state-listed. In addition, four of these listed species (Hoover's spurge, Butte County meadowfoam, hairy Orcutt grass, and Greene's tuctoria) and

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[69] Science Applications International Corporation, 2019. *Ecological Baseline Conditions Report for the Butte Regional Habitat Conservation Plan/Natural Community Conservation Plan*. Prepared for Butte County Association of Governments, Chico, CA.

[70] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

[71] California Native Plant Society, Rare Plant Program, 2021. *Inventory of Rare and Endangered Plants in California.* (Online Edition, Version 8-03 0.39.) Available: <http://www.rareplants.org>. Accessed February 2021. Sacramento, CA: California Native Plant Society.

one non-listed species (Butte County checkerbloom) are covered species in the Butte Regional HCP/NCCP.[72] All of these species have been documented as occurring in the Planning Area.[73]

The USFWS has designated critical habitat for five of the six species listed above (all except Layne's ragwort; 70 FR 46924–46999, August 11, 2005) in the northwestern portion of the Planning Area (Figure 13-2). The critical habitat locations are designated within portions of the United States Geological Survey (USGS) 7.5-minute Biggs, Campbell Mound, Chico, Foster Island, Hamlin Canyon, Nord, Oroville, Paradise West, Richardson Springs, Richardson Springs NW, Shippee, and Vina quadrangles.

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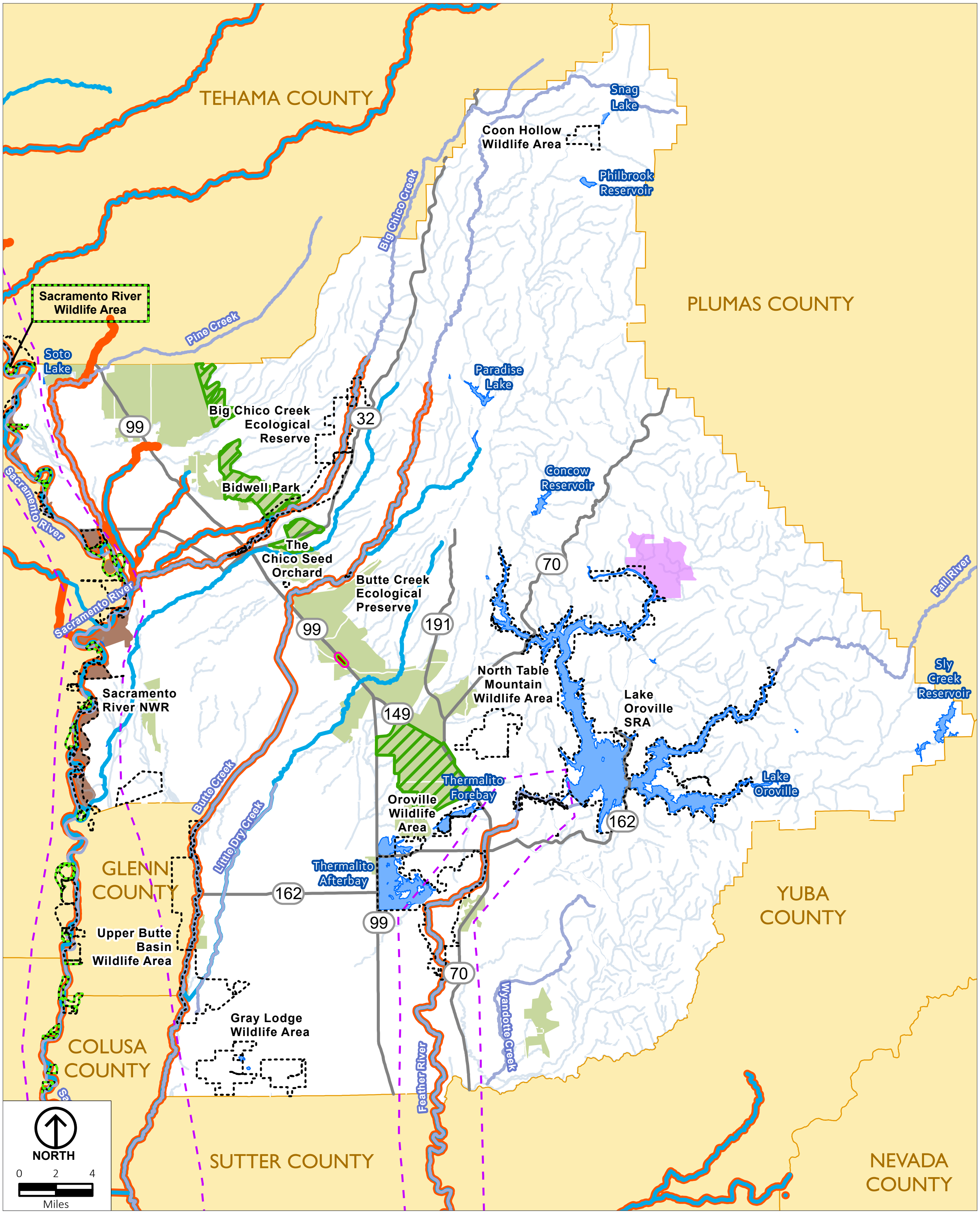
[72] Science Applications International Corporation, 2019. *Ecological Baseline Conditions Report for the Butte Regional Habitat Conservation Plan/Natural Community Conservation Plan*. Prepared for Butte County Association of Governments, Chico, CA.

[73] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.



Source: CDF, CSP, CDFW, USFWS, NOA.

Species with Critical Habitat

- Parks, Preserves, Wildlife Areas
- USFWS Vernal Pool Core Areas
- Spring-Run Chinook Salmon
- Central Valley DPS Steelhead
- Green Sturgeon
- California Red-Legged Frog
- Hoover's Spurge
- Butte County Meadowfoam
- Greene's Tuctoria
- Hairy Orcutt Grass
- Western Yellow-billed Cuckoo (Proposed)

Figure 13-2
Critical Habita

b. Special-Status Wildlife

Based on a review of existing information, 55 special-status wildlife species have been documented or have the potential to occur in Butte County.[74]

Twenty-one of these species are federally or state listed or are federal candidates for listing, and 24 are California species of special concern. The listing status, preferred habitat, and occurrence information for each of these species is listed in Table 13-3. Fifteen of the 55 species listed in Table 13-3 are covered species in the Butte Regional HCP/NCCP.

Critical habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp was designated on August 11, 2005 (70 FR 46924–46999). Within Butte County, critical habitat for the branchiopods listed above is located around the Chico area and southeast to Oroville (Figure 13-2). The USFWS also has designated critical habitat for California red-legged frog in the eastern-central portion of the county (units BUT-1A and 1B) (71 FR 19244–19346, April 13, 2006). The habitat is in the eastern portion of the county on the USGS 7.5-minute Berry Creek and Brush Creek quadrangles. Critical habitat for western yellow-billed cuckoo was proposed on February 27, 2020 (85 FR 11458-11594) and is located along the Sacramento River.[75]

c. Special-Status Fish

Five federally and/or state-listed fish species are known to occur in Butte County (Table 13-4).[76] An additional four species are California species of special concern. Four fish species included in Table 13-4 (Central Valley spring-run and fall/late-fall run Chinook salmon, green sturgeon, and Central Valley DPS steelhead) are covered in the Butte Regional HCP/NCCP.[77,78]

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[74] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

[75] U.S. Fish and Wildlife Service, 2021. IPaC Resource List: Butte County. Available:<https://ecos.fws.gov/ipac/location/I43VP3UJ2JCSTBJQ4PZDFX2FEY/resources>. Accessed: February 3, 2021.

[76] California Department of Fish and Wildlife, 2021. RareFind 5, Online Version, commercial version dated: February 3, 2021. Records search of Butte County. Sacramento, CA: California Department of Fish and Wildlife.

[77] U.S. Fish and Wildlife Service, 2021. IPaC Resource List: Butte County. Available:<https://ecos.fws.gov/ipac/location/I43VP3UJ2JCSTBJQ4PZDFX2FEY/resources>. Accessed: February 3, 2021.

For fish, critical habitat includes waterways, substrate, and adjacent riparian zones that provide spawning, rearing, and migrating areas that are essential to the survival of the species. Impassable barriers such as dams or naturally impassable barriers are not included in critical habitat designation (64 FR 24050, May 5, 1999). Critical habitat for steelhead, green sturgeon, and Chinook salmon is designated within Butte County.

Critical habitat for Central Valley steelhead (70 FR 52614, September 2, 2005) and Central Valley spring-run Chinook salmon is designated in the Feather River from the confluence of the Yuba River upstream to Oroville Dam (70 FR 52598, September 2, 2005) and in the Sacramento River and tributaries in Butte County, such as Big Chico Creek, Lindo Channel, Mud Creek, and Rock Creek. The Sacramento River in the study area is designated as critical habitat for winter-run Chinook salmon (58 FR 33212).

[78] Science Applications International Corporation. 2019. *Ecological Baseline Conditions Report for the Butte Regional Habitat Conservation Plan/Natural Community Conservation Plan*. Prepared for Butte County Association of Governments, Chico, CA.

TABLE 13-4 SPECIAL-STATUS FISH SPECIES DOCUMENTED OR IDENTIFIED AS HAVING THE POTENTIAL TO OCCUR IN THE PLANNING AREA

Common and Scientific Name	Status[a] Federal/ State/HCP	California Distribution	Habitats	Occurrence in the Planning Area
Delta smelt (*Hypomesus transpacificus*)	T/E/–	Sacramento-San Joaquin Delta.	Pelagic; open waters and sloughs of the Delta.	Absent. Planning area is outside the range for this species.[b]
Steelhead – California Central Valley DPS *Oncorhynchus mykiss irideus*	T/–/CS	Sacramento River and tributary Central Valley rivers	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 7.8° to 18°C (Moyle 2002). Habitat types are riffles, runs, and pools.	Feather and Sacramento Rivers and tributaries[b]
Chinook salmon (Sacramento River winter-run ESU) *Oncorhynchus tshawytscha*	E/E/–	Sacramento and San Joaquin rivers and their tributaries downstream of impassible dams and other migration barriers.	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0° to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	Sacramento River[b]
Chinook salmon (Central Valley spring-run ESU) *Oncorhynchus tshawytscha*	T/T/CS	Feather, Sacramento, and San Joaquin rivers and their tributaries downstream of impassible dams and other migration barriers.	Has the same general habitat requirements as winter-run Chinook salmon. Coldwater pools are needed for holding adults (Moyle 2002).	Feather and Sacramento Rivers and tributaries[b]
Chinook salmon (Central Valley fall/late fall-run ESU) *Oncorhynchus tshawytscha*	–/SSC/CS	Feather, Sacramento, and San Joaquin rivers and tributaries downstream of impassible dams and other migration barriers.	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0° to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	Feather River and Sacramento River
Green sturgeon (southern distinct population segment) *Acipenser medirostris*	T/SSC/CS	Sacramento, lower Feather, and Klamath and Trinity rivers (Moyle 2002)	Spawns in large river systems with well-oxygenated water, with temperatures from 8.0° to 14°C.	Feather River and Sacramento River[b]
River lamprey *Lampetra ayresi*	–/SSC/–	Sacramento, San Joaquin, and Napa rivers; tributaries of San Francisco Bay (Moyle 2002; Moyle et al. 1995)	Adults live in the ocean and migrate into fresh water to spawn.	Feather River and Sacramento River
Hardhead *Mylopharodon conocephalus*	–/SSC/–	Sacramento-San Joaquin and Russian River drainages. In the San Joaquin River, scattered populations found in tributary streams, but only rarely in the valley reaches of the San Joaquin River.	Relatively undisturbed streams at low to mid elevations.	North Fork Feather River

TABLE 13-4 SPECIAL-STATUS FISH SPECIES DOCUMENTED OR IDENTIFIED AS HAVING THE POTENTIAL TO OCCUR IN THE PLANNING AREA

Common and Scientific Name	Status[a] Federal/ State/HCP	California Distribution	Habitats	Occurrence in the Planning Area
Sacramento splittail *Pogonichthys macrolepidotus*	–/SSC/–	Occurs throughout the year in low-salinity waters and freshwater areas of the Sacramento–San Joaquin Delta, Yolo Bypass, Suisun Marsh, Napa River, and Petaluma River (Moyle 2002).	Spawning takes place among submerged and flooded vegetation in sloughs and the lower reaches of rivers.	Not likely to occur in the Planning Area.

[a] Status:

Federal
E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
C = candidate for threatened or endangered status.
SC = species of concern.
FP = proposed for delisting.

State
E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
FP = fully protected under the California Fish and Game Code.
SSC = species of special concern in California.

Butte County Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP)
CS = Covered Species

Sources: Moyle, P.B., 2002. *Inland fishes of California*. 2nd edition. Davis, CA: University of California Press. Moyle, P.B., R.M. Yoshiyama, J.E. Williams, and E.D. Wikramanayoke, 1995. *Fish Species of Special Concern of California*. California Department of Fish and Game. Rancho Cordova, CA.

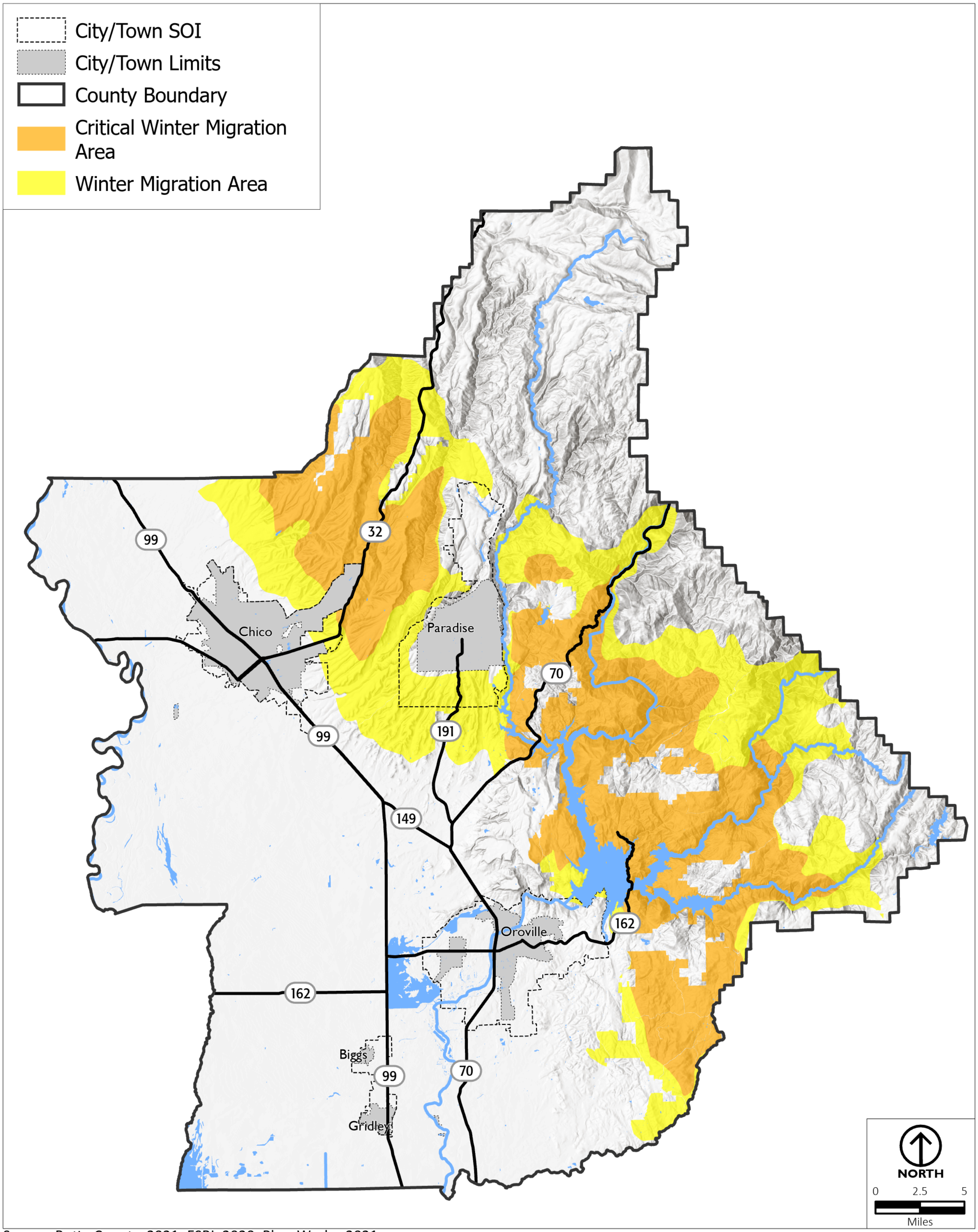
[b] Known occurrences from NMFS West Coast Region Species List (November 2016).

Essential fish habitat (EFH) is the aquatic habitat (water and substrate) necessary for fish to spawn, breed, feed, or grow to maturity[79] that will allow a level of production needed to support a long-term, sustainable commercial fishery and contribute to a healthy ecosystem. All runs of Chinook salmon (spring, winter, and fall/late-fall) are covered under the EFH.

3. Migratory Deer Herds

Protection of Butte County's resident and migratory deer herds has long been an issue of concern for the County. Efforts to protect the State's migrant deer herds were initiated in the late 1970's and early 80's by CDFW, who also developed management plans, including mapping of key migratory corridors and seasonal ranges for migratory deer herds. Using these maps, the County refined the mapping for the purposes of the 2030 General Plan. The update process involved a Geographic Information System (GIS) analysis of vegetation and habitat value, elevation and terrain preferences for migratory deer, fire suppression activities, and deer use based on consultations with CDFW staff. The product of these efforts is displayed on Figure 13-3. The County incorporated this mapping into the General Plan Conservation and Open Space Element and Land Use Element, and as the basis of the Deer Herd Migration Area Overlay in the General Plan. This GIS-based mapping allows for identification of sensitive deer habitat as part of project environmental review. The overlay requires developments to adhere to minimum lot sizes and other mitigation measures to protect the deer herd areas.

[79] National Marine Fisheries Service, 1998. A primer for federal agencies—essential fish habitat: new marine fish habitat conservation mandate for federal agencies.



Source: Butte County, 2021; ESRI, 2020; PlaceWorks, 2021.

FIGURE 13-3

DEER HERD AREAS

4. Important Wildlife Areas

Important wildlife areas in Butte County are public lands that have been preserved for the benefit of wildlife. Often these areas have a recreational or educational component as well. These areas provide the essential habitat components of food, water, and shelter, as well as areas for breeding and nesting/rearing of young for wildlife. Important wildlife areas in Butte County include Big Chico Creek Ecological Reserve, Butte Creek Ecological Preserve, Upper Butte Basin, Coon Hollow, Lake Oroville State Recreation Area, Bidwell Park, Chico Seed Orchard, Gray Lodge Wildlife Area, Oroville Wildlife Area, Sacramento River Wildlife Area, and Sacramento River National Wildlife Refuge (see Figure 13-1). A brief overview of each of these areas follows.

a. Big Chico Creek and Butte Creek Ecological Preserves

The Big Chico Creek Ecological Reserve is located approximately 7 miles northeast of Chico, in the foothills of the Sierra Nevada. The preserve is 3,950 acres large and includes and protects 4.5 miles of Big Chico Creek. Habitats within the preserve include creek riffles and pools, riparian areas, oak woodlands, chaparral, pine forest, rock cliffs, and springs, which support more than 140 different wildlife species, including a number of listed species.[80] The Butte Creek Ecological Preserve is a 93-acre parcel located along the middle section of Butte Creek. The preserve includes more than a mile of habitat along the creek, which provides critical salmon habitat and spawning grounds.[81] Chico State Enterprises is a 501(c)(3) auxiliary organization of California State University, Chico that owns and operates both preserves.

b. Upper Butte Basin Wildlife Area

The Upper Butte Basin Wildlife Area is approximately 9,600 acres within the Butte Basin, a low-lying area extending from the Sacramento River south and east to the Butte Creek drainage and southward to include the Butte Sink. The area is considered one of the finest wetland habitat complexes in North America. The Wildlife Area was created to protect and/or restore some of the historical wetlands

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[80] Big Chico Creek Ecological Reserve. Available at: <http: Big Chico Creek Ecological Reserve – CSU, Chico> Accessed February 12, 2021.

[81] Butte Creek Ecological Reserve Butte Creek Available at: <Ecological Preserve – CSU, Chico>. Accessed February 12, 2021.

that originally characterized the area. The area provides many recreational opportunities including fishing, hunting, and bird watching.[82,83] !!
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c. Coon Hollow Wildlife Area

Coon Hollow Wildlife Area, totaling 731 acres, occurs at 6,000 feet in elevation and contains wet meadows, riparian vegetation, timbered uplands, and mountain streams. The area provides many recreational opportunities including fishing, hunting, hiking, and bird watching.[84] !!4pecies that can be observed at the area include birds of prey such as sharp-shinned hawk (*Accipiter striatus*), northern goshawk, and long-eared owl (*Asio otus*); mammals such as Townsend's big-eared bat and snowshoe hare; and herpetiles such as California newt (*Taricha torosa*) and mountain king snake (*Lampropeltis zonata*).[85]

d. Lake Oroville State Recreation Area

Lake Oroville, at the Lake Oroville State Recreation Area, is a human-made lake that was created when a 770-foot earthen dam was constructed within the Feather River.[86] The lake contains various fish species, including catfish, crappie, bluegill, red eye bass (*Micropterus coosae*), largemouth bass (*Micropterus salmoides*), smallmouth bass, spotted bass (*Micropterus punctulatus*), and sturgeon.[87] The lake primarily functions as a recreation area but also provides habitat, water, and foraging opportunities for wildlife. The recreation area includes the Feather River Fish Hatchery (previously discussed in Section C.1, Biological Communities).[88]

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[82] California Department of Fish and Wildlife. <. https://wildlife.ca.gov/Lands/Places-to-Visit/Upper-Butte-Basin-WA> Updated February 4, 2021. Accessed February 16, 2021.

[83] California Department of Fish and Wildlife. <https://wildlife.ca.gov/Lands/Places-to-Visit/Coon-Hollow-WA> Updated February 4, 2021. Accessed February 16, 2021.

[84] California Department of Fish and Wildlife. <. https://wildlife.ca.gov/Lands/Places-to-Visit/Upper-Butte-Basin-WA> Updated February 4, 2021. Accessed February 16, 2021.

[85] California Department of Fish and Wildlife. <https://wildlife.ca.gov/Lands/Places-to-Visit/Coon-Hollow-WA> Updated February 4, 2021. Accessed February 16, 2021.

[86] California State Parks, 2021. Lake Oroville SRA. Available: <http://www.parks.ca.gov/?page_id=462>. Accessed: February 4, 2021.

[87] Fishing the Lake, no date. Available: < https://www.lakeoroville.net/fishing-lake-oroville.html >. Accessed: February 4, 2021.

[88] California State Parks, 2021. Lake Oroville SRA. Available: <http://www.parks.ca.gov/?page_id=462>. Accessed: February 4, 2021.

e. Bidwell Park

Bidwell Park is a city park that was established in 1905 through a donation of 2,500 acres of land by Annie Bidwell. Since it originated, the City of Chico has purchased additional land, making Bidwell Park one of the largest municipal parks in the country, totaling 3,670 acres.[89] Five miles of Big Chico Creek flow through the park. The park is divided into "Lower Bidwell Park" and "Upper Bidwell Park." Lower Bidwell Park is a flat area within the valley, and Upper Bidwell Park has steep, rocky terrain within the foothills of the Sierra Nevada. Big Chico Creek within Lower Bidwell Park has a well-developed riparian forest along it, whereas in Upper Bidwell Park, the area along the creek is open and rocky. Bidwell Park contains various plant communities that provide habitat for a wide diversity of both native plant species and wildlife. A number of special-status mammal, birds, reptiles, amphibians, and fish species are known to occur in the park, and it provides habitat for many more special-status species.[90]

f. Chico Seed Orchard

The Chico Seed Orchard is 209 acres and in the City of Chico. It began operations in 1904 when the site was assigned to the Agricultural Research Service. The center is owned and managed by the US Department of Agriculture (USDA) Forest Service, Mendocino National Forest, and is an important part of reforestation efforts throughout the United States. Native conifer seedlings that have been developed with the most desirable characteristics for growth, vigor, and disease resistance are grown at the center and then planted throughout the United States. The center has a nature trail that meanders through a botanical area in Edgar Slough. This area provides habitat for several wildlife species.[91] Trees and plants at the center provide habitat for 200 species of birds, as well as resident snakes and mammals.[92]

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[89] City of Chico, no date. Bidwell Park. Available: < https://www.chico.ca.us/bidwell-park >. Accessed: February 5, 2021.

[90] California State University, Chico, Research Foundation, 2000. *A Resource Inventory of Upper Bidwell Park Expansion Area.* August. Prepared for the City of Chico Parks Department. Chico, CA.

[91] USDA Forest Service, 2005. Mendocino National Forest: Genetic Resource and Conservation Center. Available: < https://www.fs.usda.gov/recarea/mendocino/recarea/?recid=25248>. Accessed: February 5, 2021.

[92] California Watchable Wildlife, no date. Chico Seed Orchard. Available: < https://cawatchablewildlife.org/mobile/view_site.php?site=53&display=q&q=1601323969 >. Accessed February 5, 2021.

g. Table Mountain

Table Mountain is a plateau of ancient volcanic rock, located just north of Oroville. The CDFW owns a portion of Table Mountain and manages it as a wildlife area. Most people know the area for its unique and spectacular spring wildflower display that occurs after vernal pools on the mountain have dried. Other habitats at Table Mountain include open grasslands, oak woodlands, vertical cliff faces, beds of angular volcanic cobble, and wetlands, which provide food, shelter, and water for several animals, including reptiles, birds, and mammals. Special-status birds that occur at the wildlife area include burrowing owl, peregrine falcon, Swainson's hawk, and golden eagle.[93]

h. Gray Lodge Wildlife Area

The Gray Lodge Wildlife Area is a 9,100-acre wildlife preserve, located southwest of Gridley. The wildlife area is managed by the CDFW. Its location along the Pacific Flyway provides habitat for many species of birds, including more than 1 million wintering waterfowl, as well as gulls, American white pelicans (*Pelecanus erythrorhynchos*), hawks, eagles, white-tailed kites, and owls, including burrowing owls. Freshwater marsh is abundant within the refuge, supporting a diversity of wetland plants, invertebrates, fish, amphibians, reptiles, water birds and mammals. There are also about 600 acres of riparian woodlands within the Gray Lodge Wildlife Area, providing habitat for aquatic and terrestrial species like the garter snake, great blue heron, ringtail (*Bassariscus astutus*) and river otter.[94]

i. Oroville Wildlife Area

The 11,870-acre Oroville Wildlife Area is located 5 miles west of Oroville. It was created subsequent to construction of the Oroville Reservoir to provide wildlife habitat as mitigation for construction of the Oroville Reservoir. This artificial habitat was formed on dredge tailings along the Feather River and provides habitat for migrating waterfowl, shorebirds, and resident wildlife populations. Wildlife habitats at the Oroville Wildlife Area include riparian forest bordered by 12 miles

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[93] Begley, E., 2000. North Table Mountain: All of the beauty, majesty and wonder of California. Outdoor California Magazine. September–October. Available: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=85242&inline >. Accessed: February 16, 2021.

[94] California Department of Fish and Wildlife, 2021. Gray Lodge Wildlife Area. Available: <https://wildlife.ca.gov/Lands/Places-to-Visit/Gray-Lodge-WA>. Last updated: February 4, 2021. Accessed: February 5, 2021.

of river channel, as well as annual grassland, fresh emergent wetlands, and oak woodland. The CDFW owns and manages the Oroville Wildlife Area.[95]

j. Sacramento River Wildlife Area

The Sacramento River Wildlife Area is located along the Sacramento River between Highway 32 and the Glenn County–Colusa County line. It consists of five units totaling 3,737 acres that are owned and managed by the CDFW. Three of the units are located within or partially within Butte County. Habitats within the wildlife area include riparian woodland, meadows, and gravel bars.[96] These lands were acquired to preserve, enhance, and restore Sacramento River riparian wetland habitats and to provide habitat for the wildlife species associated with the area, particularly threatened and endangered species.

k. Sacramento River National Wildlife Refuge

The Sacramento River National Wildlife Refuge (SRNWR) is one of five national wildlife refuges (and three wildlife management areas) that comprise the Sacramento National Wildlife Refuge Complex, located approximately 90 miles north of Sacramento. The USFWS manages the SRNWR, some of which is within Butte County. Currently, the SNRWR is composed of approximately 10,000 acres of riparian habitat, wetlands, uplands, and intensively managed orchards along a 77-mile stretch of the Sacramento River between Red Bluff and Princeton. Riparian habitat in the SNRWR is critically important for anadromous fish (including four runs of Chinook salmon), migratory birds, plants, and river-system health. Animals found within the SNRWR include turtles, river otter, beaver, mountain lion (*Felis concolor*), American white pelicans, ospreys, and state-listed bank swallows.[97]

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[95] California Department of Fish and Wildlife, 2021b. Oroville Wildlife Area. Available: < https://wildlife.ca.gov/Lands/Places-to-Visit/Oroville-WA >. Last updated: February 4, 2021. Accessed: February 5, 2021.

[96] California Department of Fish and Wildlife, 2021c. Sacramento River Wildlife Area. Available: <https://wildlife.ca.gov/Lands/Places-to-Visit/Sacramento-River-WA>. Last updated: June 5, 2021. Accessed: February 5, 2021.

[97] U.S. Fish and Wildlife Service, 2020. Sacramento River National Wildlife Refuge. Last updated: June 5, 2020. Available: <https://www.fws.gov/refuge/sacramento_river/ >. Accessed: February 5, 2021.

14 ENERGY

Energy is of critical concern in Butte County in two primary respects. The first is related to consumer-driven energy demand from supply to and conservation by county residents, businesses, and agricultural and public users. The second concerns energy production, a key economic sector in Butte County. This chapter is divided into two main sections which address these separate but related areas.

Energy production, energy conservation and patterns of energy consumption are increasingly important issues for local government. Changes in the regulation of energy production make it crucial that Butte County maintain existing and establish new energy policies that encourage greater efficiencies in energy use, and a shift to cleaner, lower carbon and reliable sources of energy. Comprehensive energy conservation policies should help reduce overall energy costs for the county, residents, and businesses. Certain land use policies and zoning can promote reduced energy consumption, low or no carbon energy sources, renewable energy, and an equitable and reliable distribution of energy needs.

I. ENERGY SUPPLY, DEMAND, AND CONSERVATION

This section describes existing conditions with regard to supplies of electricity and gas to residential and non-residential users in Butte County, current and future energy consumption trends among those users, and the ways in which businesses, individuals, and the County can reduce energy demand through conservation.

A. Energy Supply and Distribution

This section describes the supply and distribution of energy to utilities consumers in Butte County. Supplies of natural gas and electricity to the county are subject to California Public Utilities Commission and U.S. Department of Energy regulations.

1. Energy Supply

a. PG&E Electricity Supply

The Pacific Gas and Electric Company (PG&E) provides Butte County with most of its electricity. The cities of Gridley and Biggs run their own power companies, Gridley Municipal Utilities and Biggs Electrical Department, which each purchase their electricity through the Northern California Power Agency (NCPA). Electricity provided by both jurisdictions is sourced from both the NCPA's Lake County geothermal facility and natural gas plant and the federal government's Shasta Dam. Additional energy power is purchased as needed by contracts with various energy companies in the open market.

Electricity purchased from PG&E by local customers in Butte County is generated and transmitted to the county by a statewide network of power plants and transmission lines. Electricity purchased by PG&E has grown increasingly renewable under California's Renewable Portfolio Standard (most recently updated by Senate Bill 100 in 2018) which obligates energy service providers like PG&E to procure 33 percent of their electricity from eligible renewable energy sources by 2020, 60 percent from eligible renewable energy sources by 2030, and 100 percent from eligible renewable energy or other carbon-free sources by 2045.

The largest number of electrical power generation facilities in Butte County are hydroelectric projects. Many of the other facilities use mainly renewable technologies, including, photovoltaics, fuel cells, landfill methane capture, biomass, and small cogeneration technologies.

b. Butte Choice Energy Electricity Supply

The Butte County Board of Supervisors and the Chico City Council entered into a Joint Powers Authority agreement in 2019 to create the Butte Choice Energy Authority, a community choice aggregation (CCA) which would allow for the direct purchase and generation of electricity for residents and businesses. This program, called Butte Clean Energy, will provide the residents and businesses in the unincorporated areas of the county and the City of Chico with a choice for where they purchase their power.

The Butte County General Plan 2030 and the 2014 Climate Action Plan directed County staff to evaluate the feasibility of a CCA program. An increase in local interest by residents and businesses propelled the formation of the CCA primarily due to cost savings and independence in selection of sources and types of energy compared to PG&E. However, CCAs may provide an additional environmental benefit if the CCA supplies more electricity from renewable and other carbon-free sources than other providers, effectively reducing the generation and release of greenhouse gas emissions (GHGs). The program is set to launch in 2023. All electricity suppled through Butte Choice Energy would be transmitted through existing PG&E power lines, described in more detail below.

c. Electrical Distribution

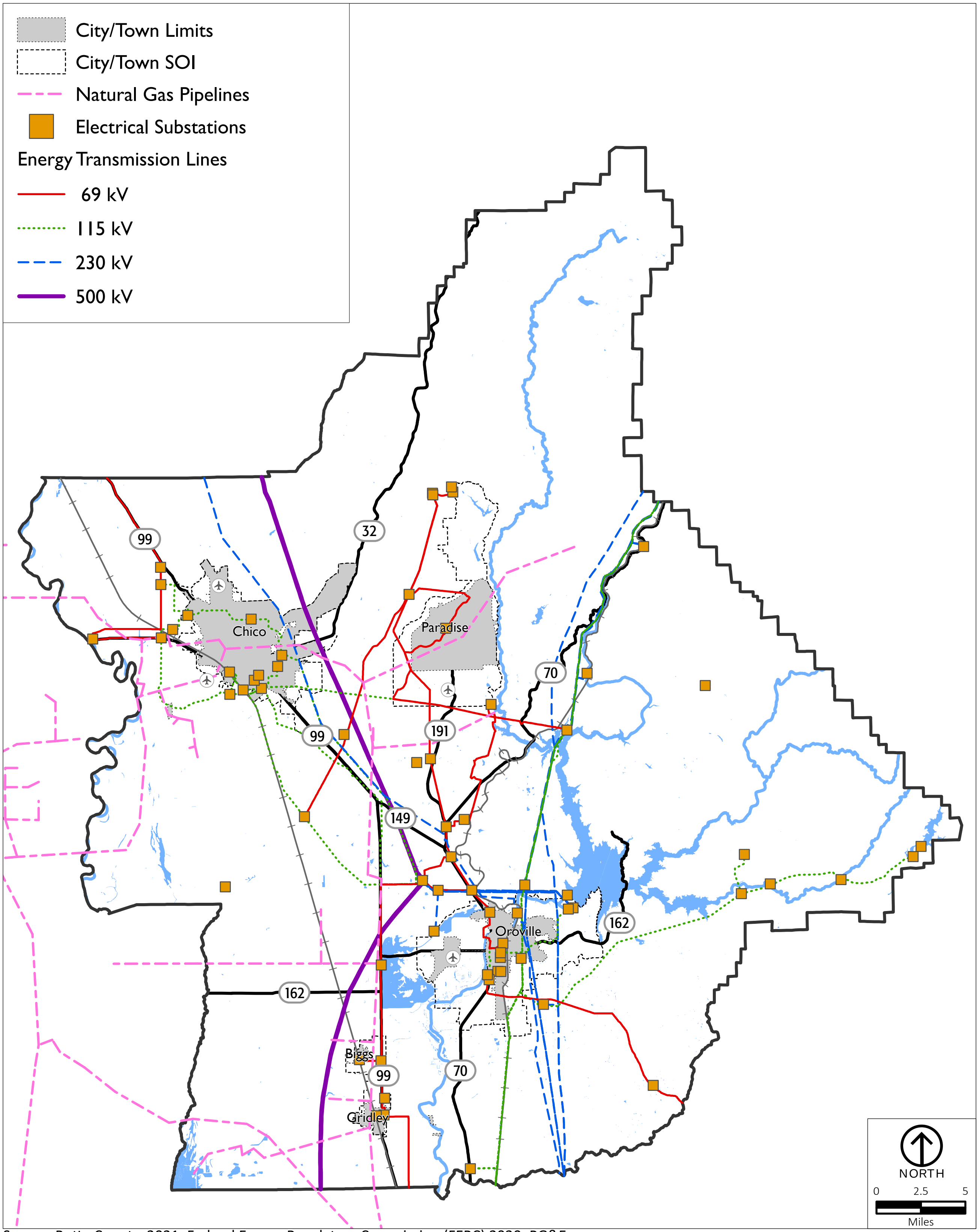
The network of power lines that carries power from high voltage lines to individual homes, government facilities and businesses is referred to as the distribution system. Various transmission and distribution lines traverse Butte County, serving to carry electrical power from power plants within and outside the county to electrical substations where power is converted to voltages suitable for distribution to end users.

During high wind events, also known as "red flag events," PG&E can turn off the powerlines through the Public Safety Power Shutoff Program to prevent arcing and sparking of the electrical transmission lines, which reduces the risk of wildfires from downed power lines. Wildfires can also damage power lines, natural gas lines, and substations. PG&E can retrofit power lines and other equipment to insulate them against extreme heat events and severe weather and remove diseased or dead trees surrounding the lines to protect them from falling trees and wildfires. PG&E is undertaking programs and improvements to minimize shutoffs and their impacts in Butte County and the remainder of the service area. See Chapter 17, Hazards and Safety, for more information about wildfire hazards and the Camp Fire, which was started by a PG&E power transmission line that malfunctioned and sparked.

Butte County has control over the siting of electrical substations. Major existing lines in Butte County are illustrated on Figure 14-1. Additional information about the electricity transmission network, or grid, is provided in Section II.C since it is an integral component of energy production in Butte County.

d. Gas

PG&E also supplies most of the natural gas used within Butte County. Much of this supply comes from Canada, along with some from the United States southwest and the Rocky Mountains and is supplied to the region through the Hershey station in Colusa County. Major gas pipelines in the county are mapped on Figure 14-1.



Source: Butte County, 2021; Federal Energy Regulatory Commission (FERC) 2020; PG&E; 2020; PlaceWorks, 2021; U.S. Energy Information Administration; 2020

FIGURE 14-1

ENERGY FACILITIES

Wild Goose Storage Inc. operates an underground natural gas storage facility in Butte County. A 25-mile pipeline carries gas between the main PG&E pipeline in Colusa County and the Wild Goose facility, which stores natural gas in an underground rock formation, or reservoir, that previously produced natural gas. Gas is injected into the reservoir by compressors, where it is stored until subsequently withdrawn and delivered to customers over the PG&E natural gas transmission and distribution system.

In parts of Butte County not served by PG&E's gas distribution network, including many of the county's rural areas, residents and businesses make use of liquid propane gas (LPG) or other tanked or bottled gas for heating and cooking.

e. Solar Power

Statewide solar initiatives began in January 2006, when the California Public Utilities Commission approved the California Solar Initiative, authorizing the state to invest $3.2 billion in small-scale solar electric power systems over eleven years, ultimately ending in 2017. This legislation established the foundation for the Million Solar Roofs Act, whereby the state was able to construct 3,000 megawatts (MW) of solar electric power. The amount of money committed and the scope of this program made California the largest solar investor of any state in the nation.

In Butte County, solar energy is an expanding source of energy production, both for residential and non-residential users. Several large-scale, non-residential systems are in place in the county. These include the Butte County Solar Energy System, located at the Butte County Government Center in Oroville. This project was completed in August of 2004 and has a total output of the project at 997-kilowatt (KW) AC or 1.8 MW DC, which provides for all of the electrical needs for three County buildings. At the time of its completion, this system was the fifth largest solar energy system in the US, and among the 25 largest systems in the world. The County is currently considering expansion to this system to provide for increasing power needs. In addition to this facility, in October 2005 the City of Chico opened a 1.1 MW solar array facility at its municipal wastewater treatment plant, the Sewerage Commission in Oroville installed a 0.52 MW solar array at its facility in November 2002, and in July 2005, Butte College opened a 1.06 MW solar system.

Solar photovoltaic power generation, including small-scale rooftop solar power systems, increased particularly after the adoption of the 2014 Climate Action Plan, which included several strategies and actions focused on encouraging the installation of such systems. In 2015, a total of approximately 9,500 KW of solar panels were installed in Butte County across approximately 1,500 sites. The 2014 Climate Action

Plan, currently being updated, additionally resulted in the preparation of the Butte Utility-Scale Solar Guide approved by the Board of Supervisors in September 2017. The Utility-Scale Solar Guide is a component of the PowerButte initiative and provides information for anyone interested in learning more about solar facilities in Butte County. The Guide includes sections regarding Butte County's vision for utility-scale solar facility development, guiding principles, entitlement process information, State and local context, opportunities and constraints, recommended standards and design guidelines, a GIS mapping tool, and community benefit analyses.

In 2019, solar PV and solar thermal power plants in California produced approximately 28,463 gigawatt-hours (gWh) of energy, comprising just over 14 percent of the state's in-state generation portfolio. There is a total of 748 operating commercial solar power plants with an installed capacity of approximately 12,338 MW in the state. In Butte County specifically, there are a total of 809 residential and 98 nonresidential solar installations that produce a total of 19,109 kilowatt-hours of solar electricity.

Further expansion of residential and non-residential solar facilities has significant potential in the county. A number of planning considerations are involved in siting of solar collection devices, including maintenance of solar access so that the sun's energy can be captured. The California Solar Rights Act of 1978 specifically recognizes the legality of easements for solar access between property owners, prohibits ordinances or covenants restricting the use of solar systems, and requires tentative subdivision maps to provide for solar access.

Solar collection devices must be properly sited to receive incoming energy from the sun. Furthermore, a site with solar development must be protected from obstructions that block the collection function. Solar access refers to the unobstructed exposure to the sun that a solar collector requires to operate properly. Solar access can be a complicated issue because it deals with a number of variables. The following list of key variables are important because they have the potential to threaten the efficiency of energy collection.

- ♦ Constant change of the sun's position in the sky.
- ♦ Tilt and orientation of the solar collection surface.
- ♦ Sun tracking features of the solar collection surface.

- ♦ Existence or future development of structures adjacent to the solar collection surface that may interfere with solar collection.
- ♦ Presence and type of vegetation adjacent to the collector.
- ♦ Lengthy periods of rain or overcast conditions during the summer which decrease the efficiency of the solar panels.
- ♦ Lengthy periods of temperatures exceeding 100 degrees Fahrenheit which decrease the efficiency of the solar panels.

f. Other Energy Sources

Several other areas of potential energy production, including cogeneration and waste-to-energy development, have not been fully developed in the county, although there is potential to do so. Cogeneration refers to the generation of electricity and other energy jointly. Other energy types, such as wind, geothermal and oil and gas production, are not expected to occur at any significant levels in Butte County.

The Sierra Nevada Brewery in Chico has pioneered the use of alternative energy sources in Butte County. The brewery has installed 25 KW co-generation fuel-cell technology into their operations. The overall energy efficiency of the installation is double that of grid-supplied power and air emissions are significantly reduced. Surplus electrical energy is to be sold back into the power grid.

Additional information on these various sources is provided in Section II.

B. Energy Consumption Trends

Forecasting future energy needs for a county or region is a complex undertaking that can be developed through a wider range of analyses, including projections of future energy demand, utilities costs and supply, and analysis of population growth trends, land use trends and patterns of energy consumption.

As the fluctuations in price and supply of electricity and gasoline in the early 2000s demonstrated, there is a substantial level of uncertainty associated with predicting future energy demand and supply, since many factors determine the pricing of electricity, gasoline, and natural gas. In turn, pricing affects the feasibility and rate of new energy source development. These uncertainties result in highly speculative projections that must be constantly updated to accommodate changes in market conditions.

Thus, it may be more useful to extrapolate the energy future of Butte County from population growth, trends in land development and patterns of energy consumption. These factors change more slowly in Butte County, and they also present issues over which the County has a limited degree of control. In this way the County can help to facilitate the energy needs of its residents and businesses continue to be met in the timeframe of this General Plan, while it also works to improve energy conservation.

1. Population Growth

A full description of the county demographics, projected changes in the county population, and the distribution of populations between the incorporated urban areas and the more rural unincorporated areas of the county is available in the Population chapter of this document. As noted there, the Butte County Association of Governments projects that there will be an additional 8,103 housing units in the unincorporated County by 2040, and an additional 14,512 residents. These new residents will increase the demand for electricity and gas in the county.

2. Land Use

Land use policy and regulation affect energy use in several ways. The locations and relationship between different land uses has a direct relationship to energy consumption. The specific land use policies and regulations can be found in greater detail in the Land Use Chapter of this document.

Many residents find Butte County's rural character attractive, which has implications for energy usage. According to the California Energy Commission (CEC), rural residents use a larger amount of electricity per capita than urban dwellers do. This is because these counties often experience more extreme climate conditions, leading to higher cooling and heating costs. In addition, rural residents pay for services in their electricity bill that urban consumers pay for in other bills. When rural residents are not connected to piped water systems, they must rely on water wells and electric pumps to connect them with water. Rural residents also must install more outside lighting if their homes and streets do not have streetlights.

In general, higher density residential users consume less energy per dwelling unit due to the smaller spaces to be heated and cooled, fewer construction materials used, and increased opportunities for service by public transit, which consumes less fuel per passenger than single occupant automobiles. Though development in the cities of Butte County will outpace growth in the unincorporated areas, the bulk of building will be low density residential housing. This will keep reliance on public transit largely confined to the urban areas.

3. Consumption Patterns

To facilitate the assessment of local energy consumption patterns, it is useful to determine the types and purposes of energy consumption in Butte County. The energy that is tracked falls under two primary categories: electricity and natural gas. In Butte County specifically, residential land uses used approximately 253.2 million kilowatt-hours of electricity and 5.1 million therms of natural gas in 2019. Nonresidential land uses used approximately 153.4 million kilowatt-hours of electricity and 3.9 million therms of natural gas. This difference between residential and nonresidential electricity and natural gas consumption is relatively standard to other rural communities in California.

a. Residential

Table 14-1 shows the types of energy used to heat residential dwellings in Butte County based on US Census data from 2000 and 2019. This data indicates that the use of "utility gas" (another name for natural gas) and wood showed the most significant decreases in use between 2000 and 2019. The use of electricity and "bottle, tank, or LP gas" (another name for propane) both increased during the same time period.

TABLE 14-1 NUMBER OF HOUSING UNITS AND TYPE OF ENERGY CONSUMED, BY ENERGY NEED – BUTTE COUNTY 2000-2019

	2000		2019	
Fuel for Space Heating	**Housing Units**	**Percent of Total**	**Housing Units**	**Percent of Total**
Utility gas	44,827	56.34%	38,415	49.47%
Bottled, tank, or LP gas	7,761	9.75%	9,325	12.01%
Electricity	17,020	21.39%	23,199	29.88%
Fuel oil, kerosene, etc.	263	0.33%	67	0.09%
Wood	9,137	11.48%	4,917	6.33%
Solar energy	26	0.03%	934	1.20%
Other fuel	395	0.50%	368	0.47%
No fuel used	137	0.17%	426	0.55%
Total	79,566	100%	77,651	100%

Source: U.S. Census Bureau, 2000 and 2019*, Housing Characteristics, Butte County, California.*

There are various factors that influence the type and amount of energy consumed in a residential structure. The most important are the type of dwelling units, the size of the structure, the number of occupants and their habits, the weather conditions and time of year, the thermal integrity of the building (level of insulation and number and location of windows), the number of appliances (e.g., washing machine, clothes dryer, and swimming pool), and the type of appliances (e.g., gas versus electric heaters and ranges).

Typically, the most important factors influencing residential energy consumption are the size of the house, the type of house (detached single-family or multifamily structure), and the number of major appliances. A single-family home requires more energy for space heating than a multifamily unit, due to its bigger size and the amount of heat loss through external walls. It also requires more energy for operation of major appliances, as it usually houses more occupants.

Some residential energy needs can be fulfilled by either natural gas or electricity (e.g., space and hot water heating, cooking and clothes drying), while others are most likely dependent on electricity (e.g., lighting, radio, and television). In most homes, space and water heating use the most energy. Air conditioning and the use of major appliances such as ovens, refrigerators, televisions, and clothes dryers are other primary users of energy. In homes with swimming pools or spas, such facilities are usually among the largest energy users.[1]

b. Commercial

The specific uses of electricity and natural gas in commercial buildings will vary widely depending on the building type. For example, lighting and office equipment are the largest electricity uses in an office building, while the largest share of a restaurant's electricity is spent on refrigeration and cooking. However, on average, the biggest user of electricity in a commercial building is lighting, followed by cooling, refrigeration, and ventilation. The largest natural gas uses in commercial buildings are space heating, water heating, and cooking. All other energy uses in commercial buildings account for approximately 31 percent of electricity use and 9 percent of natural gas use.

[1] California Energy Commission, October 2010. *2009 California Residential Appliance Saturation Study, Volume 2: Results*. Available at: http://web.archive.org/web/20190602112012/https://www.energy.ca.gov/2010publications/CEC-200-2010-004/CEC-200-2010-004-V2.PDF. Accessed February 27, 2021.

c. Industrial

In contrast to energy consumption in the residential and commercial sectors, industrial patterns of energy consumption depend upon the specific type of industrial operations. The major industrial activities in Butte County are wood processing, manufacturing, and gravel mining.

Energy use within the general category of "industrial processes" includes a number of specific uses.

- ♦ A significant portion of industrial gas use is for the purpose of heating water to various temperatures.
- ♦ Wood processing and manufacturing industries are high electrical and natural gas users. In general, these industries use electricity for 60 percent of their energy needs and natural gas for the remaining 40 percent.
- ♦ Electricity runs motors, conveyor belts, chipping machines, and manufacturing equipment. Natural gas is consumed for space heating and some specific industrial processes.
- ♦ In the stone and mineral extraction industry, electricity runs handling and crushing equipment. Drying and additional processing requires natural gas and/or fuel oils.
- ♦ The electricity portion of industrial process consumption includes a mixture of lighting, motor operation and the operation of more sophisticated electronic equipment.

d. Agricultural

Agricultural energy consumption represents a large portion of the total energy consumption in Butte County. As agricultural production continues to evolve, the energy needs in the county will also shift. Electricity is important in the agricultural sector since it is the main source of energy used to operate irrigation pumps, fans and wind-producing machines used to protect fruits from winter frost. Natural gas, while critical to the greenhouse industry, heating of agricultural buildings and crop drying, is used less than electricity in agricultural activities. To counteract high prices and electricity blackouts, the Butte County Rice Growers Association (BUCRA) incorporated a 200 KW solar array to their rice drying facility in 2004; since then, they've continued to expand their solar energy infrastructure, including a second 200 KW solar array constructed in 2009 and a new 2 MW solar array at the main plant constructed in 2016.

C. Energy Conservation

Energy price fluctuations in the late 1990s and increases in early 2001, combined with rolling blackouts, have led to a renewed interest in energy conservation. With continuing uncertainty concerning electricity and natural gas prices, energy policies and programs can reduce energy use, resulting in the reduction of overall energy expenditures in the county. Further, the Public Safety Power Shutoffs conducted by PG&E and other electrical utilities have led to an interest in alternative power supply such as independent solar facilities, batteries for storage, or generators.

Butte County has several opportunities to promote energy conservation and reduce energy consumption, mainly through enforcing construction standards and through its own operations. Butte County has pursued several programs that increase energy efficiency. Such programs include the low-income weatherization program, which provides weatherization services to low-income families to improve energy efficiency performance in their homes; the promotion and awarding of funding through the Property Assessed Clean Energy (PACE) program, which funds energy efficiency upgrades in homes and businesses; and enforcement of State-mandated standards for energy efficiency and conservation, detailed below.

1. Construction Standards

The State of California requires local governments to address energy conservation and efficiency in new construction. In Butte County, the Building Division of the Department of Development Services is responsible for enforcing all the provisions of the State Building Standard Code, including Part 6 of Title 24 of the California Code of Regulations, commonly referred to as the "California Energy Code." The California Energy Code was originally adopted in June 1977 and is updated on a three-year cycle. Title 24 requires the design of building shells and building components to conserve energy. The 2019 California Energy Code, which went into effect at the beginning of 2020, is the most recent version and improves upon the previous 2016 standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2019 standards move toward cutting energy use in new homes by more than 50 percent and will require installation of solar photovoltaic (PV) systems for single-family homes and multifamily buildings of three stories and less. The 2019 standards focus on four key areas: (1) smart residential PV systems; (2) updated thermal envelope standards (preventing heat transfer from the interior to exterior and vice versa); (3) residential and nonresidential ventilation requirements; and (4) nonresidential lighting requirements.[2] Under the 2019 standards, nonresidential buildings will be 30 percent more energy efficient compared to the 2016 standards, and single-family homes will be 7 percent more energy efficient.[3] When accounting for the electricity generated by the solar PV system, single-family homes would use 53 percent less energy compared to homes built to the 2016 standards.[4]

Additionally, the California Building Standards Commission adopted the California Green Building Standards Code, also known as CALGreen, in Part 11 of Title 24. CALGreen establishes standards that apply to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure throughout the state, unless otherwise indicated in the California Building Standards Code. The purpose of CALGreen is to improve public health, safety, and general welfare by enhancing the design and construction of buildings. CALGreen encourages sustainable construction practices in energy efficiency. Compliance with the CALGreen Code is not a substitution for meeting the certification requirements of any green building program.

[2] California Energy Commission, 2018, News Release: Energy Commission Adopts Standards Requiring Solar Systems for New Homes, First in Nation, accessed February 27, 2020.

[3] California Energy Commission, 2018, 2019 Building Energy and Efficiency Standards Frequently Asked Questions, http://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf, accessed February 27, 2020.

[4] California Energy Commission, 2018, 2019 Building Energy and Efficiency Standards Frequently Asked Questions, http://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf, accessed February 27, 2020.

II. ENERGY PRODUCTION AND REGULATION

This section describes the past, present and potential future of energy production resources in Butte County.

A. History of Energy Development in Butte County

The history of energy development in Butte County contains a variety of energy sources. One of Butte County's earliest sources of energy was methane gas generated through a coal gasification process. Two plants near Oroville produced the gas, which was later distributed by the California Gas and Electric Corporation and General Western Power of California. The energy produced was delivered to specific users such as lumber processing plants, mining operations and agricultural facilities. Some on-site generation of steam and oil manufactured gas was used for light and power in lumber processing plants and mining operations. Household heating and lighting was still conducted on an independent scale using wood-burning stoves and lanterns. Over the following years, energy demands in the San Francisco Bay Area catalyzed the development of energy export facilities in Butte County. Energy supplied by methane capture has increased in Butte County due to methane capture at the Neal Road Landfill, which is estimated to capture 90 to 95 percent of annual methane emissions for conversion into usable energy.

Hydroelectricity was a natural opportunity for the county to increase its capacity for energy production. Energy production in Butte County took a significant step forward with construction of the Centerville Hydroelectric Facility on Butte Creek. This powerhouse was completed in 1898 and was originally owned by the Butte County Electric Power and Lighting Company. The plant had two transmission lines that served Chico and Oroville, with an initial combined capacity of 800 KW. Gridley was served by a distribution center in the town of Colusa. The development of hydroelectric power plants and the ready availability of electricity for residential, commercial, and industrial uses was partly responsible for a significant increase in the county's population in the early 1900s.

The De Sabla Powerhouse was built in 1903 and represented the effort of a number of engineers who later took leading roles in the development of PG&E. Construction of the De Sabla Hydroelectric Facility was noted for its engineering difficulty. The De Sabla Reservoir and Powerhouse are located on Butte Creek above the Centerville Powerhouse. Intricate systems of old mining conduits previously used by the Cherokee Mining Company were reconditioned to supply water to the reservoir.

Construction of the De Sabla Powerhouse was made possible by Eugene de Sabla's purchase of the entire Cherokee Mining Company water system, including its system of ditches, pipelines, and dam. PG&E, the owner and operator of the De Sabla Powerhouse, began seeking offers from independent companies to purchase the De Sabla Powerhouse in 2017. This is likely due to a decreased demand for natural gas supplies.

The pioneers of hydroelectricity did not have the heavy construction equipment available today. Instead of bulldozers, dump trucks, and motored transport, the construction was completed using teams of horses and mules. Equipment was lowered into the canyons with cables and windlass, and horse-drawn plows, and scrapers graded roads and reservoirs.

The custom of the time was to finance new power projects separately, even though the stockholders of an existing company and those of the new may be identical. Consequently, when a group of stockholders entered into the retail distribution of electricity and gas, a new company was organized. In this way, many individual companies were developed to serve the county's power needs. Eventually, Eugene de Sabla Jr. and John Martin bought these companies.

Eugene de Sabla, Jr. and John Martin were primarily responsible for development of the PG&E system. They built power plants and consolidated utility systems to form the foundation of PG&E. This process required the acquisition of many regional power and water companies. By 1908, PG&E had control over the majority of Butte County's power. Companies were either acquired directly or descended to PG&E through California Gas and Electric Corporation and General Western Power of California. Table 14-2 lists the component companies from Butte County, with principal groups providing headings for formerly incorporated companies.

In the late 1920s, PG&E developed an efficient method of delivering heat and energy to homes, office buildings, and industry. The technology for delivery of natural gas was finally established to allow transportation from distant fields to the principal cities in its service area. However, Butte County and other regions in PG&E's northern domain were unable to find dependable and adequate sources of natural gas. In the late 1930s, PG&E was able to construct gas pipelines from rich gas regions in southern California, including the Kettleman Hills and Topock gas fields, to the northern areas.

Due to the very limited natural gas resources in Butte County, over the last 100 years hydroelectricity has become the county's leading energy producer. The eastern portion of the county developed rapidly with new hydroelectric plants, and additional smaller facilities are still being proposed. The benefits of combining water supply and energy production into one facility have made hydroelectricity a very desirable power supply in the county. The importance of hydroelectric power generation is indicated by the existence of 17 hydroelectric facilities in the county.

Only in Butte County's recent history has the technology of cogeneration surfaced as a viable source of energy. The Pacific Oroville Power Inc. (POPI) facility was constructed in 1986 and supplied energy to the PG&E grid system; however, it has since closed. The Oroville Cogeneration Limited Partnership facility was constructed in 1990, providing electricity during periods of peak energy demand. The Koppers lumber facility was constructed in 1948, and its cogeneration facility was added as an accessory use from 1983 until the plant's closure in 2000. Currently, the Sierra Nevada Brewery runs part of its operations on energy derived from cogeneration.

TABLE 14-2 PG&E ACQUIRED POWER COMPANIES – BUTTE COUNTY

Company Name	Date Organized
California Gas and Electric Corporation	1901 (Acquired by PG&E 1906)
Butte County Electric Power and Lighting Company	1899
Butte County Power Company	1901
Cherokee Mining Company	1858
Chico Gas and Electric Company	1901
Chico Gas Company	1874
Chico Gas, Electric Power, and Lighting Company	1900
Valley Counties Power Company	1902
Great Western Power Company of California	1915 (Acquired by PG&E 1930)
Feather River Power Company, organized in 1925	1925
Western Canal Company, organized in 1915	1915
Direct Acquisition	
Butte and Tehama Power Company, organized in 1909	1909
Cataract Gold Mining and Power Company	1909
Durham Light and Power Company	1906
Feather River Pine Mills Inc.	1927
Lava Bed Dredging Company	1900
Marigold Dredging Company	1901

Company Name	Date Organized
Oro Development Company	1911
Oro Electric Corporation	1911
Oro Water, Light and Power Company	1905
Oroville Electric Light company	1889
Oroville Gas, Electric Light, and Power Company	1895
Oroville Light and Power Company	1901
Oroville Water Company	1878

Source: Michael Clayton & Associates, 1991.

B. Energy Production and Regulation

This section discusses energy production-related issues in Butte County. Each subsection describes the existing, proposed, and future potential development of each major energy resource, its regulatory environment, and the County's regulatory role.

1. Hydroelectric

Energy produced through the operation of hydroelectric facilities is a very important resource in Butte County. The first hydroelectric plant began operation in 1898, serving Oroville and Chico. The construction of other plants ensured a reliable source of energy that spurred the county's growth in the early 20th century.

a. Regulatory Setting

All proposed hydroelectric projects in Butte County are subject to review by various federal, State, and local agencies. The Clean Water Act, Sections 410, 402 and 404, authorizes the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers (ACOE), and State water quality agencies to grant permits in an effort to control water pollution. The ACOE is also responsible for implementing the River and Harbor Act of 1899 by issuing permits for construction or dredging in a public waterway. Enforcement of the River and Harbor Act ensures that the basic natural features of a waterway will be maintained. Most hydroelectric facilities in the state are under the jurisdiction of the CEC.

The Endangered Species Act of 1973 gives authority to the U.S. Fish and Wildlife Service to review proposed projects for potential impact to endangered species. In addition, the Federal Energy Regulatory Commission (FERC) is authorized by the Federal Power Act and the Public Utility Regulatory Policies Act to license non-federal projects occurring in the county.

b. Existing Facilities/Expansion Potential

A majority of the significant waterways in the county are employed in some aspect of hydroelectric capacity. Although hydropower has a long history in the region, in the past few years Butte County has experienced a marked increase in hydroelectric project development, expansion and improvement. This increase is motivated in part by the marketability of electricity and by the comparatively small depletion of natural resources incurred by the technology. PG&E has proposed a number of small hydroelectric projects at existing facility sites. This type of development is primarily due to the unavailability of new building sites in the county. Although the capacity of Butte County for large-scale hydroelectric facilities is considered fully developed, there remains considerable potential for small-scale hydroelectric development at existing facilities.

Hydroelectric facilities in Butte County vary in design and layout. However, all projects contain a dam or diversion structure to control water and create a hydrostatic head, a turbine to convert water flow to mechanical energy, and a generator to convert the mechanical energy into electricity.

Table 14-3 lists the existing major hydroelectric facilities in Butte County. Their locations are also shown on Figure 14-1. These major hydroelectric facilities are mostly located in the eastern portion of the county, on the rivers and creeks running out of the Sierra Nevada foothills. Such facilities in Butte County produce approximately 4,243,465 mega-watt hours per year. The County is the third largest hydroelectric producing county in the state, behind Shasta and Fresno Counties.[5]

c. Future Development

Although very little potential exists for development of new large-scale hydroelectric facilities in Butte County, small hydroelectric development offers the county an economically attractive energy source that does not substantially deplete natural resources and has the potential to make significant contributions to the county's energy needs.

[5] California Energy Commission. *California Hydroelectric Statistics and Data.* Available at: https://ww2.energy.ca.gov/almanac/renewables_data/hydro/index_cms.php. Accessed February 27, 2021.

TABLE 14-3 EXISTING HYDROELECTRIC FACILITIES IN BUTTE COUNTY

Plant Name	Alias	Date Online	Service Area	Owner	Megawatts
Thermalito		2/1/68	PG&E	CDWR	115.1
Coal Canyon		12/1/07	PG&E	PG&E	1
Forks of Butte Hydro Project	Energy Growth Partners I	3/1/92	PG&E	Hypower Inc.	14.5
Forbestown		1/1/62	PG&E	South Feather Water & Power	41.9
Woodleaf		11/1/63	PG&E	South Feather Water & Power	67.2
De Sabla	Forks of Butte Hydro	2/28/63	PG&E	PG&E	18.4
Kelly Ridge		1/1/63	PG&E	South Feather Water & Power	10
Lassen Station/Camp Creek		5/22/86	PG&E	Lassen Station Hydroelectric LP	1
Perry Logging	Mud Creek	1/26/83	PG&E	Mud Creek Hydro Partners	0.3
Poe		5/1/58	PG&E	PG&E	142.8
Lime Saddle		8/1/06	PG&E	PG&E	2
Centerville	Desalba-Centerville Project	1/2/00	PG&E	PG&E	6.4
Kanaka	STS-Kanaka	2/13/89	PG&E	STS Hydropower Ltd.	1.1
Edward C. Hyatt	Oroville Field Division Hyatt Power Plant	6/1/68	PG&E	CDWR	644.1
Toadtown	Desalba-Centerville Project	4/1/86	PG&E	PG&E	1.8
Sly Creek		11/1/83	PG&E	South Feather Water & Power	12.1
Thermalito Diversion Dam		7/1/87	PG&E	CDWR	3.4
Cresta		1949	PG&E	PG&E	73.8

Source: United States Environmental Protection Agency, February 24, 2021, eGRID2019, Existing Hydroelectric Facilities, https://www.epa.gov/egrid/download-data.

2. Biomass Conversion

Biomass conversion as a source of energy production is defined as the controlled combustion of biochemically derived materials (such as plant matter and wastes, or non-recyclable pulp or paper) for the production of electricity or heat.[6]

Energy generation from biomass conversion has received increased interest due to the need for diversified energy development. There are 86 biomass energy facilities in California that generate 5,758 gigawatt-hours per year.[7] The construction and operation of biomass facilities have been encouraged through energy tax credits and favorable buy-back rates. However, tax credits have since been eliminated, ending that incentive. Furthermore, concern over air emissions associated with the use of biomass materials for fuels has made the regulation of this energy source stricter.

There are several types of biomass conversion processes that use a variety of fuels. Biomass facilities are usually privately owned, and electricity produced is used in a cogeneration capacity (e.g., in a timber mill operation). These facilities are typically located near their primary fuel source to minimize the transportation of fuel to the conversion site. Another essential siting requirement is proximity to electrical transmission facilities with available capacity. Types of biomass conversion processes include:

- ♦ Direct Combustion where conventional steam boilers are used to burn dry woody fuel or agricultural waste. The efficiency range for this type of cogeneration is 21 to 25 percent. This is the most common method used.
- ♦ Methane Fermentation converts animal wastes from agricultural operations such as dairies and feedlots to a biogas that is burned like a natural gas. The wastes are anaerobically broken down to form the gas, leaving carbon dioxide as a major byproduct.
- ♦ Gasification involves partial oxidation of biomass (usually wood) to produce biogas. Although this process results in a lower conversion efficiency, existing gas and oil-fired boilers can be easily retrofitted to accommodate the gasification system. This type of biomass conversion would be suitable for special

[6] California Integrated Waste Management Board website, http://www.ciwmb.ca.gov/LGCentral/Basics/Biomass.htm, accessed February 26, 2007.

[7] California Energy Commission. *California Biomass and Waste-to-Energy Statistics and Data*. Available at: https://ww2.energy.ca.gov/almanac/renewables_data/biomass/index_cms.php. Accessed February 27, 2021.

applications, particularly in remote areas where other forms of electrical power are not available.

- ♦ Biochar is a form of biomass that produces a charcoal-like substance made by burning organic material from agricultural and forestry waste in a controlled process called pyrolysis. Biochar can be used to improve soil properties, fertility, and carbon sequestration while also producing renewable energy.

a. Regulatory Environment

The CEC maintains jurisdiction over biomass facilities with generated capacities of 50 MW or greater. For projects less than 50 MW, the California Waste Management Board acts as an advisory agency and reviews all applications. The permit process for these smaller projects is handled by the Butte County Planning Division and the Butte County Air Quality Management District.

b. Existing and Closed Facilities

The Neal Road Landfill is the only biomass conversion site in Butte County. The County captures methane released from decomposing solid waste accumulated at the Neal Road Landfill and converts that methane into electricity. As of 2015, Butte County has sustained maximum practical methane capture rate at the Neal Road Recycling and Waste Facility, capturing an estimated 90 to 95 percent of the methane released on-site.

In 2012, Butte County closed the Pacific Oroville Power Inc. (POPI) biomass conversion facility, which was the only cogeneration plant in the county. The plant, which is located in Oroville, burned wood waste through the direct combustion process to generate electricity which is sold to PG&E. It generated 18.8 MW of electricity, though it was licensed at 22 MW. The wood fuel for the plant came from agricultural wastes and timber operations.

3. Cogeneration

Cogeneration is a long-established and proven technology recently revived by the desire to conserve limited energy resources and to achieve energy self-sufficiency through the use of alternative technologies. Electricity can be produced through cogeneration of waste heat in business, industry, and governmental facilities, thus saving money and conserving energy.

Cogeneration can be defined as simultaneous production of electrical or mechanical energy and thermal energy. There are many types of cogeneration systems, including dual-purpose power plants, some waste heat use systems, certain types of district heating systems, space heating and cooling in municipal and commercial applications and total energy systems. By recapturing and using some of the thermal energy that is normally discharged in the industrial process, cogeneration can reduce system fuel requirements by up to 30 percent.

a. Regulatory Environment

Cogeneration projects are subject to many of the federal, State, and local regulations affecting industrial facilities, as well as other regulations pertaining specifically to electricity generation. The CEC is authorized by the Warren-Alquist Act of 1975 to regulate the siting of all thermal power plants larger than 50 MW, including cogeneration plants. The County would also have regulatory power over cogeneration facilities to ensure compliance with local general plan and zoning provisions. For projects under 50 MW, the County is the lead agency to conduct the environmental review required under the California Environmental Quality Act.

There are numerous other federal and State regulations that establish cogeneration requirements regarding fuel use (Federal Fuel Use Act and Natural Gas Policy Act), power exchanges (Public Utility Regulatory Policies Act), environmental quality, financing and ownership, and health and safety.

b. Existing Facilities/Expansion Potential

Industrial uses offer the greatest potential fuel savings through cogeneration. Industry often uses process steam in applications requiring low temperature heat (less than 400 degrees Fahrenheit), but generates steam through direct combustion of fossil fuels with resulting temperatures of over 3,000 degrees Fahrenheit. This high-temperature combustion heat generates electricity, then uses the normally wasted exhaust heat for the industrial process. In addition, cogeneration can reduce an industrial consumer's energy vulnerability by providing improved efficiency, greater control, and increased reliability of service. Cogenerated electricity can either be sold to PG&E or used to reduce site demand and energy charges.

In addition to POPI, the Oroville Cogeneration Limited Partnership facility was a cogeneration facility, but it has now closed. Originally constructed in 1990, the facility was designed to provide electricity during periods of peak energy demand. Energy was produced by several natural gas-fired internal combustion engines (1 MW/engine) coupled with generator units. This facility generated 8.1 MW of electricity, and was sold to PG&E.

No other cogeneration plants are proposed or planned in Butte County.

c. Future Development

Continued development of cogeneration facilities can create public policy advantages, specifically the reduction in dependence on expensive and vulnerable supplies of foreign oil. For this reason, State legislation has reduced barriers to cogeneration, thus enhancing the economic attractiveness of this type of energy technology. However, favorable utility rates for purchases of excess cogenerated power have recently been removed, thereby reducing the incentives for future cogeneration development.

4. Oil, Gas, and Coal Energy Generation

Oil, gas, and coal deposits are non-renewable sources of energy. Due to past exploitation of these resources, opportunities for new oil, gas, or coal-fueled energy development have largely been depleted. For some time now, these forms of energy generation have been considered "conventional" because of their widespread use. However, due to the lack of quality oil and gas resources in the county, and the impending depletion of those that do exist, extraction of these energy sources will not be the basis of future economic enterprises in the county.

a. Natural Gas Development

Six actively producing gas fields were once found in Butte County in the sedimentary valleys east of the Sacramento River. Formerly, natural gas was produced at two other facilities, the Durham gas field and the Perkins Lake gas field. The potential for further gas extraction in the future is limited due to the depletion of this resource. In April 2015, the Butte County Board of Supervisors voted to amend the County's Zoning Ordinance to prohibit the storage or disposal of hydraulic fracturing byproducts (fracking) in the county.

The majority of natural gas wells in the county are considered "abandoned," meaning they have been filled with cement and are no longer operable. The abandoned wells are identified by the following field names: Chico Ranch, Schohr Ranch, and Llano Seco Gas fields. These fields have been depleted of most of their economically extractable reserves.

There is one underground natural gas storage facility in the county, Wild Goose Storage LLC. In June 1997, Wild Goose Storage became California's first independent gas storage utility, created by a unanimous vote by the California Public Utility Commission. In mid to late 1998, the central facilities and site pipeline were constructed, and the facility began operation in 1999. The company developed this facility to provide a major storage and reserve field for surplus natural gas delivered from Canada. The Wild Goose Storage facility stores natural gas in an underground reservoir. During periods of low natural gas demand, compressors inject gas into the storage field, and during periods of high demand, the gas is withdrawn and returned to PG&E's pipeline system. In 2003, Wild Goose Storage LLC. expanded the existing underground natural gas storage facility in Butte County with additional wells, compressors, plant facilities, and a new pipeline. The Wild Goose Gas Field is solely a storage facility. In 2014, it stored natural gas in depleted reservoirs and maintained 17 wells for storage of natural gas and four monitoring wells near Butte Creek. The facility allows for the extraction of approximately 25,129 million cubic feet (MCF) of gas annually. A 25-mile pipeline carries gas between the main PG&E pipeline in Colusa County and the expanded Wild Goose underground natural gas storage facility in Butte County.

The pipeline system used to convey natural gas resources is shown on Figure 14-1.

b. Oil and Coal Development

There are no productive oil or coal developments in Butte County. Due to a lack of commercially viable reserves, it is not expected that coal or oil development will contribute largely to future energy production in the county.

5. Solar

Solar energy is an expanding source of energy production within Butte County. While the county's climate is amenable to the production of solar energy, only recently has it become economically feasible on both a large and small scale. The county has seen the growth of solar energy use in residential and commercial applications in recent years. Use within public facilities, such as the Butte County Center array, Butte College, the Sewage Commission – Oroville Region, and the Chico Wastewater Treatment Plant, has demonstrated the feasibility of solar energy technology for larger scale applications. Additional information on solar energy use in Butte County is provided in Section I.A.

a. Regulatory Environment

New solar projects proposed in Butte County are regulated by the CEC. Typically, the CEC reviews only projects over 50 MW.

As previously noted, the Solar Rights Act specifically recognizes the legality of easements for solar access between property owners, prohibits ordinances or covenants restricting the use of solar systems, and requires tentative subdivision maps to provide for solar access.

b. Existing Facilities/Expansion Potential

There has been significant growth in the use of solar technology in Butte County since 2002. Although most solar development has been for small-scale residential use, commercial and government uses have also increased. The largest commercial/government increases include a private 570 KW system; a 1 MW system for the Butte County Government Facilities, a 480 KW system for South Feather Water & Power Agency, a 0.52 KW system at SCOR, a 1.06 MW system at Butte College, a 1 MW system at the City of Chico water treatment plant, a 168 KW facility for the City of Oroville, a 3.5 MW array in Gridley, and a 1.3 MW array referred to as the 2127 Harris Solar Project. As improvements in technology continue, increasing numbers of solar energy projects will likely be developed in Butte County.

6. Wind

Commercial wind energy is generated by using wind-powered turbines to convert wind energy to mechanical and electrical forms. Generally, persistent, strong winds, with a minimum annual average speed of 10 to 12 miles per hour are needed to make a wind generation site productive. Butte County has been identified as having a low potential for commercial wind generated energy due to a lack of strong and persistent winds.

a. Regulatory Environment

Because the County did not exercise its regulatory authority over proposed wind projects on private lands by adopting an ordinance prior to July of 2002, it is obligated to approve new wind facilities that meet the State requirements. However, because of the low wind power potential in the county, commercial wind facilities are not likely to become a significant energy industry.

b. Existing Facilities/Expansion Potential

No commercial wind generation facilities exist in the county. Wind energy is primarily used for the operation of privately-owned water pump windmills in remote agricultural operations. In 1977, the CEC established a Wind Resource Assessment Study by placing wind stations in strategic locations within Butte County to monitor wind potential. Based on the data collected from this study, the county has an average wind speed of approximately 8.5 miles per hour and is known to have prolonged periods of little to no wind.

7. Geothermal

Geothermal energy is derived from natural heat contained in the earth. This energy is used for the purposes of generating electricity and heating space and water with the help of modern technology. The natural heat of geothermal resources has been used for decades to heat homes and water in California.

While geothermal power has been identified as a major source of energy and is expected to be a significant component of energy generation in the state, no known geothermal resources exist in Butte County, and geothermal development is thus not expected in the future.

C. Transmission Lines

Butte County is presently crossed and served by two general types of transmission lines. The first type is the 500 kV transmission line that is a part of the Pacific Intertie, a major transmission line which transmits electricity from the Pacific Northwest to the Los Angeles area. The purpose of this line is to enhance service reliability throughout a large area. The second type is the 60 kV to 230 kV transmission lines that serve the specific energy needs in the county and in surrounding locations. Major transmission facilities in the county are shown on Figure 14-1.

The 500 kV transmission line is comprised of the following four transmission lines that cross the county in a north-south pattern:

- #551 – Round Mountain – Table Mountain
- #552 – Table Mountain – Tesla
- #558 – Round Mountain – Table Mountain
- #559 – Table Mountain – Vaca Dixon

These four transmission lines appear as one unified structure that is the most predominant transmission line development in the county. The 230 kV, 115 kV, and 60 kV lines conduct electricity from the 500 kV lines and local substations to serve the various cities within the county. Distribution lines, typically 21 kV and 12 kV, deliver electricity from these local transmission lines to specific customers. There are no designated transmission line corridors identified in the county, thus transmission line siting has been evaluated on a case-by-case basis.

Transmission lines can be classified according to voltage capacity, structure type and right of way required. Typically, transmission lines are constructed with different poles appropriate for the voltage. Larger voltage capacity lines (500 kV, 230 kV, and 115 kV) are often supported by steel lattice towers or twin steel poles. Lines with a lower voltage capacity (115 kV and 60 kV) are typically built with single steel or wood poles. Right of way corridors are used to promote safety and allow adequate operational space for the transmission lines.

D. Emissions Reduction Credits

The deregulation of energy production has made the mechanisms of air quality control important energy resources in themselves. This section provides information about Emissions Reduction Credits, or ERCs, and the County's role in using them.

All emissions-producing power plants in Butte County must be licensed by the Butte County Air Quality Management District. The District is responsible for assigning Emissions Reduction Credits (ERCs) to licensed power plants in the county. The availability of ERCs within the county or the ability to purchase ERC's from elsewhere within the air basin is one factor that affects energy development in the county. Because ERCs are transferable to other air quality districts, ERCs can be considered another energy asset over which the County has control.

In 2002, the Butte County Board of Supervisors approved a policy for the transfer of ERCs. This policy facilitates the evaluation of ERC transfer requests in and out of the District. Pursuant to California laws, the Board of Supervisors must approve any ERC transfer into or out of the Butte County Air Quality Management District.

a. Historical ERC Needs

Generally, ERCs have not been required for the typical business seeking to locate to Butte County, either because the projects have low emissions or because the project proponent agreed to limit production so that emissions did not exceed offset thresholds.

b. Future ERC Needs

There are no active or pending permit applications for which ERCs would be required. However, there are several rice dryers that would need to obtain PM_{10} offsets in order to expand. The staff of the Butte County Air Quality Management Board is not aware of any planned siting of a power plant in Butte County. However, ERC requirements have been identified for a potential 600 MW power plant, including offsets of 150 for NOx, 20 for ROC and 150 for PM_{10}.

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15 AIR QUALITY

A. Introduction

This section discusses the overall regulatory framework for air quality management in California and the region, including national ambient air quality standards (NAAQS) and California ambient air quality standards (CAAQS), and describes existing air quality conditions in Butte County. Information presented in this section is based in part on guidance provided by the Butte County Air Quality Management District (BCAQMD).

B. Regulatory Setting

This section discusses the federal, State, and local policies and regulations that are relevant to air quality in Butte County.

The air quality management agencies of direct importance in Butte County include the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and the BCAQMD. The EPA has established federal standards for which CARB and BCAQMD have primary implementation responsibility. CARB and BCAQMD are responsible for ensuring that state standards are met, and the BCAQMD is responsible for implementing strategies for air quality improvement and recommending mitigation measures for new growth and development. At the local level, air quality is managed through land use and development planning practices, and measures addressing air quality are implemented in Butte County through the general planning process. The BCAQMD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and State air quality laws.

1. Federal and State Ambient Air Quality Standards

This section discusses the local, State, and federal policies and regulations that are relevant to the analysis of air quality in Butte County.

Air-pollution control programs were established in California before federal requirements were enacted. However, federal Clean Air Act (CAA) legislation in the 1970s resulted in a gradual merging of State and federal air quality programs, particularly those relating to industrial sources. Air quality management programs developed by California since the late 1980s have generally responded to requirements established by the CAA.

The enactment of the California Clean Air Act (CCAA) in 1988 and the federal CAA amendments of 1990 have produced additional changes in the structure and administration of air quality management programs. The CCAA requires preparation of an air quality attainment plan for any area that violates California Ambient Air Quality Standards (CAAQS) for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), or inhalable particulate matter (PM_{10}), and ($PM_{2.5}$).

California and the federal government have established standards for several different pollutants. For some pollutants, separate standards have been set for different measurement periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as the protection of crops, the protection of materials, or the avoidance of nuisance conditions). State and federal standards for a variety of pollutants are summarized in Table 15-1.

TABLE 15-1 AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS

Pollutant	Averaging Time	California Standard [a]	Federal Primary Standard [b]	Major Pollutant Sources
Ozone (O_3) [c]	1 hour	0.09 ppm	*	Motor vehicles, paints, coatings, and solvents.
	8 hours	0.070 ppm	0.070 ppm	
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm	0.053 ppm	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	1 hour	0.18 ppm	0.100 ppm	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	*	0.030 ppm	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	0.075 ppm	
	24 hours	0.04 ppm	0.14 ppm	
Respirable Coarse Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	*	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$	
Respirable Fine Particulate Matter ($PM_{2.5}$) [d]	Annual Arithmetic Mean	12 $\mu g/m^3$	12 $\mu g/m^3$	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	*	35 $\mu g/m^3$	
Lead (Pb)	30-Day Average	1.5 $\mu g/m^3$	*	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Calendar Quarter	*	1.5 $\mu g/m^3$	
	Rolling 3-Month Average	*	0.15 $\mu g/m^3$	
Sulfates (SO_4) [e]	24 hours	25 $\mu g/m^3$	*	Industrial processes.
Visibility Reducing Particles	8 hours	ExCo =0.23/km visibility of 10≥ miles	No Federal Standard	Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt.
Hydrogen Sulfide	1 hour	0.03 ppm	No Federal Standard	Hydrogen sulfide (H2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation.

TABLE 15-1 AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS

Pollutant	Averaging Time	California Standard [a]	Federal Primary Standard [b]	Major Pollutant Sources
Vinyl Chloride	24 hours	0.01 ppm	No Federal Standard	Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Notes: ppm: parts per million; μg/m3; micrograms per cubic meter; *Standard has not been established for this pollutant/duration by this entity.

a. California standards for O3, CO (except 8-hour Lake Tahoe), SO2 (1 and 24 hour), NO2, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b. National standards (other than O3, PM, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m3 is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

c. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

d. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 μg/m3 to 12.0 μg/m3. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 μg/m3, as was the annual secondary standard of 15 μg/m3. The existing 24-hour PM10 standards (primary and secondary) of 150 μg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

e. On June 2, 2010, a new 1-hour SO2 standard was established and the existing 24-hour and annual primary standards were revoked. The 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

Source: California Air Resources Board, 2016. Ambient Air Quality Standards. https://ww2.arb.ca.gov/resources/documents/ambient-air-quality-standards-0, accessed February 17, 2021.

2. Federal Regulations

The federal CAA, enacted in 1963 and amended several times thereafter (including the 1990 amendments), establishes the framework for modern air-pollution control. The CAA directs the EPA to establish National Ambient Air Quality Standards (NAAQS) for seven pollutants: ozone, CO, lead, NO_2, respirable particulate matter less than 10 microns in diameter (PM_{10}), fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and SO_2. The standards are divided into primary and secondary standards. Primary standards are designed to protect human health, including the health of "sensitive" populations, such as asthmatics, children, and the elderly, within an adequate margin of safety. Secondary standards are designed to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The primary legislation that governs federal air quality regulations is the CAA amendments of 1990. The CAA amendments delegate primary responsibility for clean air to the EPA. The EPA develops rules and regulations to preserve and improve air quality, as well as to delegate specific responsibilities to State and local agencies.

Areas that do not meet the federal standards shown in Table 15-1 are called nonattainment areas. For these nonattainment areas, the CAA requires states to develop and adopt State Implementation Plans (SIPs), which are plans showing how air quality standards will be attained. SIPs, which are reviewed and approved by the EPA, must demonstrate how federal standards will be achieved. Failing to submit a plan or secure approval could lead to the denial of federal funding and permits for such improvements as highway construction and sewage-treatment plants. In California, the EPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. In cases in which an SIP is submitted by the State but fails to demonstrate achievement of the standards, the EPA is directed to prepare a federal implementation plan.

3. State Regulations

Responsibility for achieving California's air quality standards, which are more stringent than federal standards, is placed on CARB and local air districts and is to be achieved through district-level air quality management plans that will be incorporated into the SIPs. In California, the EPA has delegated authority to prepare SIPs to CARB, which in turn has delegated that authority to individual air districts.

CARB traditionally has established State air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air-emission inventories, collecting air quality and meteorological data, and approving SIPs.

Responsibilities of air districts include overseeing stationary source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality-related sections of environmental documents required by the California Environmental Quality Act (CEQA).

The CCAA of 1988 substantially added to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts the authority to implement transportation control measures. The CCAA focuses on attainment of the CAAQS, which, for certain pollutants and averaging periods, are more stringent than the comparable federal standards.

The CCAA requires the designation of attainment and nonattainment areas with respect to CAAQS. The CCAA also requires that local and regional air districts expeditiously adopt and prepare an air quality attainment plan if the district violates State air quality standards for CO, SO_2, NO_2, PM_{10}, $PM_{2.5}$, or ozone. These clean-air plans are specifically designed to attain these standards and must be designed to achieve an annual five percent reduction in district-wide emissions of each nonattainment pollutant or its precursors. When an air district is unable to achieve a five-percent annual reduction, the adoption of "all feasible measures" on an expeditious schedule is acceptable as an alternative strategy.[1]

The CCAA requires that the State air quality standards be met as expeditiously as practicable, but, unlike the federal CAA, it does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards.

The CCAA emphasizes the control of "indirect and area-wide sources" of air-pollutant emissions. The CCAA gives local air-pollution control districts explicit authority to regulate indirect sources of air pollution and to establish transportation control measures (TCMs). The CCAA does not define indirect and area-wide sources. How-

[1] Health and Safety Code Section 40914[b][2].

ever, Section 110 of the federal CAA defines an indirect source as: "a facility, building, structure, installation, real property, road, or highway, which attracts, or may attract, mobile sources of pollution. Such term includes parking lots, parking garages, and other facilities subject to any measure for management of parking supply."

TCMs are defined in the CCAA as "any strategy to reduce trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing vehicle emissions."

CARB's *Air Quality and Land Use Handbook: A Community Health Perspective*[2] provides recommendations for the siting of new sensitive land uses (including residences) near freeways, distribution centers, ports, refineries, chrome plating facilities, dry cleaners, and gasoline stations. The handbook recommends that new development be placed at distances from such facilities.

4. Butte County Air Quality Management District

The BCAQMD is the local air district responsible for local air quality regulation in Butte County. The BCAQMD's primary responsibility is to regulate stationary sources and develop plans to achieve and maintain air quality standards. CARB and the EPA have jurisdiction over controlling emissions from mobile sources. The BCAQMD has jurisdiction over air quality matters in Butte County. Formerly a department of the Butte County government, it is now an independent special district under California law.

BCAQMD's mission to improve air quality includes adopting and enforcing rules and regulations to attain and maintain air quality standards, issuing permits for and inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring air quality and meteorological conditions, awarding grants to reduce mobile emissions, implementing public outreach campaigns, assisting Butte County jurisdictions in addressing climate change, and updating and evaluating consistency with the Northern Sacramento Valley Air Quality Attainment Plan.

The stationary "direct" sources of air contaminants over which the District has permit authority include, but are not limited to, power plants, gasoline stations, dry cleaners, internal combustion engines, and surface coating operations. BCAQMD does not, however, exercise permit authority over "indirect" emission sources. Indirect sources are contributors to air pollution and include facilities and land uses that

[2] California Air Resources Board. 2005, April. Air Quality and Land Use Handbook: A Community Health Perspective. https://ww3.arb.ca.gov/ch/handbook.pdf

may not emit significant amounts of pollution directly themselves, but are responsible for indirect emissions, such as:

- Motor vehicle trips attracted to or generated by a land use;
- On-site combustion of natural gas and propane for heating;
- Architectural coatings (paints, stains) and consumer products; and
- Landscape maintenance.

The BCAQMD works with the Butte County Association of Governments (BCAG) to ensure a coordinated approach in the development and implementation of transportation plans throughout the county. This coordination ensures compliance with pertinent provisions of the CAA and CCAA, as well as with related transportation legislation.

5. Air Quality Plans

The CCAA requires districts to adopt air quality attainment plans and to review and revise their plans to address deficiencies in interim measures of progress once every three years. The 2018 Triennial Air Quality Attainment Plan was created by the air districts within the Northern Sacramento Valley. The purpose of the plan is to achieve and maintain healthy air quality throughout the northern air basin. The plan addresses the progress made in implementing the original plan submitted to CARB in 1991 and has been updated every three years, most recently in 2018 and approved by the District' Governing Board in December 2019. The plan includes control strategies necessary to attain the California ozone standard at the earliest practicable date.[3]

6. Air Pollutants of Concern

a. Criteria Air Pollutants

The federal and State governments have established ambient air quality standards for the following seven criteria pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. Ozone and NO_2 are generally considered "regional" pollutants, as these pollutants or their precursors affect air quality on a regional scale. Pollutants such as CO, SO_2,

[3] Basin Control Council (BCC). 2018, December 7. Northern Sacramento Valley Planning Area 2018 Triannual Air Quality Attainment Plan. Prepared by the Sacramento Valley Air Quality Engineering and Enforcement Professionals (SVAQEEP). https://bcaqmd.org/wp-content/uploads/2018-Triennial-Report-2.pdf, accessed February 17, 2021.

and lead are considered to be local pollutants that tend to accumulate in the air locally. Particulate matter is considered to be a localized pollutant as well as a regional pollutant. Within Butte County, CO, PM_{10}, $PM_{2.5}$, and ozone (O_3) are considered pollutants of concern. Brief descriptions of these pollutants are provided below, and a complete summary of State and national ambient air quality standards (CAAQS and NAAQS, respectively) is provided in Table 15-1. Additional information regarding the County's attainment status for these various pollutants, and regarding the major stationary and mobile sources of air pollution in Butte County, is provided in Section C.

i. Ozone (O_3)

Ozone is a photochemical oxidant and the major component of smog. Although O_3 in the upper atmosphere is essential to life by shielding the earth from harmful ultraviolet radiation from the sun, high concentrations of O_3 at ground level represent a significant health and environmental concern, capable of causing damage to lung tissue and plants. O_3 is formed when precursor emissions of volatile organic compounds (VOC)/reactive organic gases (ROGs) and oxides of nitrogen (NOx) react in the presence of sunlight and higher temperatures. Peak O_3 levels thus generally occur during warm periods. VOCs are emitted from sources as diverse as autos, chemical manufacturing, dry cleaners, paint shops and other sources using solvents. NOx results from fuel combustion occurring with transportation and industrial sources.[4]

ii. Particulate Matter (PM_{10} and $PM_{2.5}$)

Respirable PM is fine material, metal, soot, smoke, and dust particles suspended in the air. For health reasons, we are most concerned with inhalable particulate matter less than 10 micrometers in diameter (PM_{10}), and less than 2.5 micrometers in diameter ($PM_{2.5}$). Particles of these sizes can permanently lodge in the deepest and most sensitive areas of the lung, and can aggravate many respiratory illnesses including asthma, bronchitis, and emphysema. Sources of directly emitted particulates in Butte County include soil from farming, construction dust, paved road dust, smoke from residential wood combustion, and exhaust from mobile sources such as cars and trucks. The valley can also be impacted by agricultural and residential burning.[5]

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[4] Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

[5] Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

iii. Carbon Monoxide (CO)

CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon during fuel combustion. When CO enters the bloodstream, it reduces the delivery of oxygen to the body's organs and tissues. Health threats are most serious for those who suffer from cardiovascular disease, particularly those with angina or peripheral vascular disease. Exposure to elevated CO levels can cause impairment of visual perception, manual dexterity, learning ability and performance of complex tasks.[6]

iv. Lead (Pb)

Lead exposure can occur through multiple pathways, including inhalation of air and ingestion of lead in food, water, soil, or dust. Excessive lead exposure can cause seizures, mental retardation and/or behavioral disorders; low doses of lead can lead to damage of the central nervous system. Lead may also be a factor in high blood pressure and subsequent heart disease.[7]

v. Nitrogen Dioxide (NO_2)

NO_2 is a brownish, highly reactive gas that is present in all urban atmospheres. NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Nitrogen oxides are an important precursor both to ozone (O_3) and acid rain, and may affect both terrestrial and aquatic ecosystems. NO_2 is primarily formed in the atmosphere by oxidation of the primary air pollutant nitric oxide (NOx) which, in turn, reacts in the atmosphere with VOCs to produce O_3. The two major emission sources for NOx, which forms when fuel is burned at high temperatures, are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.[8]

6 Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

7 Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

8 Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

vi. Sulfur Dioxide (SO_2)

Sulfur dioxide affects breathing and may aggravate existing respiratory and cardiovascular disease in high doses. Sensitive populations include asthmatics, individuals with bronchitis or emphysema, children, and the elderly. SO_2 is also a primary contributor to acid deposition, or acid rain, which causes acidification of lakes and streams and can damage trees, crops, historic buildings, and statues. In addition, sulfur compounds in the air contribute to visibility impairment in large parts of the country. Ambient SO_2 results largely from stationary sources such as coal and oil combustion, steel mills, refineries, pulp and paper mills, and nonferrous smelters.[9]

b. Toxic Air Contaminants

Under the CAA, toxic air contaminants (TACs) are airborne pollutants that may be expected to result in an increase in mortality or serious illness or that may pose a present or potential hazard to human health. TACs are also referred to as toxic air pollutants or hazardous air pollutants.

Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes, locomotives), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Because it is not practical to eliminate all TACs, these compounds are regulated through risk management programs designed to eliminate, avoid, or minimize the risk of adverse health effects from exposure.

CARB regulates TACs under the California CAA. Under the federal CAA, the EPA regulates air toxic compounds as hazardous air pollutants, subject to various National Emission Standards for Hazardous Air Pollutants (NESHAPs). A chemical becomes a regulated TAC after it is identified by CARB's California Air Toxics Program or the EPA's National Air Toxics Assessments, analyzed for its potential for human exposure, and evaluated for its health effects on humans.

CARB maintains a list of approximately 200 toxic substances, including those identified by EPA and the California Air Toxics Program's TAC List, which may be accessed at: http://www.arb.ca.gov/toxics/id/taclist.htm.

[9] Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

All federal air toxics are incorporated into the California lists by reference. In addition, California regulates a large number other substances not currently on the federal list. Key California-only air toxics related to large construction and transportation projects include diesel particulate matter (DPM) and naturally-occurring asbestos.

TACs include heavy metals, organic chemicals, pesticides, and radionuclides. Gaseous air toxics such as benzene are precursor VOCs that form ground-level ozone. Some common TACs include benzene (found in gasoline), perchloroethylene (emitted from some dry-cleaning facilities), and methylene chloride (used as a solvent and paint stripper). Other examples include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

Once emitted, TACs disperse through the atmosphere and, depending upon the TAC, meteorological conditions, and other factors, may expose people through various pathways, such as:

- Breathing contaminated air.
- Eating contaminated food products, such as fish from contaminated waters; meat, milk, or eggs from animals that feed on contaminated plants; and fruits and vegetables grown in contaminated soil on which air toxics have been deposited.
- Drinking water contaminated by toxic air pollutants.
- Ingesting contaminated soil. Young children are especially vulnerable because they often ingest soil from their hands or from objects they place in their mouths.
- Touching (making skin contact with) contaminated soil, dust, or water (e.g., during recreational use of contaminated water bodies).

Certain persistent TACs can accumulate in body tissues, leading to various health impacts.[10]

[10] Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

C. Existing Conditions

1. Sacramento Valley Air Basin

CARB has delineated the jurisdiction of regional air basins and local air districts throughout the state. Butte County is located within the Sacramento Valley Air Basin (SVAB), comprising the northern half of California's 400-mile-long Great Central Valley. The SVAB encompasses approximately 14,994 square miles with a largely flat valley floor (excepting the Sutter Buttes), about 200 miles long and up to 150 miles wide, bordered on its east, north, and west by the Sierra Nevada, Cascade and Coast mountain ranges, respectively.

The SVAB, containing 11 counties and some 2 million people, is divided into two air quality planning areas based on the amount of pollutant transport from one area to the other and the level of emissions within each. Butte County is within the Northern Sacramento Valley Air Basin (NSVAB), which is composed of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, and Yuba Counties.

Emissions from the urbanized portion of the basin (Sacramento, Yolo, Solano, and Placer Counties) dominate the emission inventory for the SVAB, and on-road motor vehicles are the primary source of emissions in the Sacramento metropolitan area. While pollutant concentrations have generally declined over the years, additional emission reductions will be needed to attain the State and national ambient air quality standards in the SVAB.

Air pollutants are not confined by jurisdictional boundaries as they disperse through the atmosphere. For example, depending upon the time of year and meteorological conditions, a significant share of Butte County's air pollutants may come from the Sacramento metropolitan area, which, in turn, may receive a share of its air pollutants from the San Francisco Bay Area or the San Joaquin Valley.[11]

2. Regional Climate and Meteorology

Seasonal weather patterns have a significant effect upon regional and local air quality. The Sacramento Valley and Butte County have a Mediterranean climate, characterized by hot, dry summers and cool, wet winters. Winter weather is governed by cyclonic storms from the North Pacific, while summer weather is typically subject to a high-pressure cell that deflects storms from the region.

[11] Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

In Butte County, winters are generally mild with daytime average temperatures in the low 50s and nighttime temperatures in the upper 30s. Temperatures range from an average January low of approximately 36°F to an average July high of approximately 96°F, although periodic lower and higher temperatures are common. Rainfall between October and May averages about 26 inches but varies considerably year to year. Heavy snowfall often occurs in the northeastern mountainous portion of the County. Periodic rainstorms contrast with occasional stagnant weather and thick ground or "tule" fog in the moister, flatter parts of the valley. Winter winds generally come from the south, although north winds also occur.

Diminished air quality within Butte County largely results from local air pollution sources, transport of pollutants into the area from the south, the NSVAB topography, prevailing wind patterns, and certain inversion conditions that differ with the season. During the summer, sinking air forms a "lid" over the region, confining pollution within a shallow layer near the ground that leads to photochemical smog and visibility problems. During winter nights, air near the ground cools while the air above remains relatively warm, resulting in little air movement and localized pollution "hot spots" near emission sources. Carbon monoxide, nitrogen oxides, particulate matters and lead particulate concentrations tend to elevate during winter inversion conditions when little air movement may persist for weeks.

As a result, high levels of particulate matter (primarily $PM_{2.5}$) and ground-level ozone are the pollutants of most concern to the NSVAB Districts. Ground-level ozone, the principal component of smog, forms when ROG and NOx – together known as ozone precursor pollutants – react in strong sunlight. Ozone levels tend to be highest in Butte County during late spring through early fall, when sunlight is strong and constant, and emissions of the precursor pollutants are highest. [12]

3. Ambient Air Quality Conditions

Existing air quality conditions in Butte County can be characterized in terms of the ambient air quality standards that the federal and State governments have established for various pollutants, as shown in Table 15-1, and by monitoring data collected in the region. Monitoring data concentrations are typically expressed in terms of parts per million (ppm) or micrograms per cubic meter (μg/m³).

[12] Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

The local air districts within the NSVAB (under the auspices of CARB) maintain 14 monitoring stations to continuously measure criteria air pollutants. In Butte County, CARB monitors air quality at the following stations: Chico (East Avenue); Paradise (4405 Airport Road and Paradise Theater); and Gridley (Cowee Avenue). The Paradise Theater and Gridley Cowee Avenue monitoring sites do not have official air quality data on record. The Paradise 4405 Airport Road site has data for ozone and the Chico East Avenue site has data for ozone, CO, NO_2, and PM.[13] Data from the Chico East Avenue site and the Paradise Airport monitoring stations are shown in Table 15-2 for the last three available years.

[13] Butte County Air Quality Management District. 2014, October 23. CEQA Air Quality Handbook, Guidelines for Assessing Air Quality and Greenhouse Gas Impacts for Projects Subject to CEQA Review.

TABLE 15-2 AMBIENT AIR QUALITY MONITORING DATA

	Chico			Paradise Airport Road		
Pollutant Standards	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Ozone						
State 1-Hour ≥ 0.09 ppm	0	0	0	0	2	0
State/Federal 8-hour ≥ 0.070 ppm	0	0	0	17	20	0
Maximum 1-Hour Conc. (ppm)	0.076	0.076	0.072	0.091	0.108	0.075
Maximum 8-Hour Conc. (ppm	0.069	0.069	0.063	0.080	0.098	0.069
Nitrogen Dioxide (NO_2)						
State 1-Hour ≥ 0.18 (ppm)	0	0	0	n/a	n/a	n/a
Maximum 1-Hour Conc. (ppb)	37.5	51.9	42.1	n/a	n/a	n/a
Particulate Matter (PM10)						
State 24-Hour ≥ 50 µg/m³	14	40	4	n/a	n/a	n/a
Federal 24-Hour ≥ 150 µg/m³	0	9	0	n/a	n/a	n/a
Maximum 24-Hour Conc. (µg/m³)	101.4	478.7	55.7	n/a	n/a	n/a
Particulate Matter (PM2.5)						
Federal 24-Hour ≥ 35 µg/m³	2	18	0	n/a	n/a	n/a
Maximum 24-Hour Conc. (µg/m³)	47.0	417.0	34.6	n/a	n/a	n/a

Notes: ppm = parts per million; ppb = parts per billion; µg/m3 = micrograms per cubic meter; * = insufficient data; n/a = Not Available
Data may include exceptional events (e.g., wildfires).
Source: California Air Resources Board, 2021, Air Pollution Data Monitoring Cards (2017, 2018 and 2019). http://www.arb.ca.gov/adam/index.html, accessed February 18, 2021.

4. Attainment Status and Air Quality Planning

If monitored pollutant concentrations meet State or federal standards over a designated period of time, the area is classified as being in attainment for that pollutant. If monitored pollutant concentrations violate the standards, the area is considered a nonattainment area for that pollutant. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated unclassified. Attainment status for various pollutants is summarized in Table 15-3.

TABLE 15-3 STATE AND FEDERAL ATTAINMENT DESIGNATIONS FOR BUTTE COUNTY

Pollutant	Federal Standards	State Standards
1-hour ozone	No Standard [a]	Nonattainment
8-hour ozone	Nonattainment	Nonattainment
Carbon monoxide (CO)	Attainment	Attainment
Nitrogen dioxide (NO_2)	Attainment	Attainment
Sulfur dioxide	Attainment	Attainment
24-hour Inhalable particulate matter (PM_{10})	Attainment	Nonattainment
24-hour Inhalable particulate matter ($PM_{2.5}$)	Attainment	No Standard
Annual Inhalable particulate matter (PM_{10})	No Standard	Attainment
Annual Inhalable particulate matter ($PM_{2.5}$)	Attainment	Nonattainment

Notes: n/a = not applicable.
[a] The federal ozone 1-hour standard was revoked by the EPA and is no longer applicable for federal standards.
Source: Butte County AQMD. 2018. Air Quality Standards & Air Pollutants. https://bcaqmd.org/planning/air-quality-standards-air-pollutants/ Accessed February 17, 2021.

5. Existing Air Quality Inventory

Butte County is home to many industries, processes, and actions that generate emissions of criteria pollutants. CARB compiles an emissions inventory for all sources of emissions within the county as part of the SIP. This inventory is used by the BCAQMD and CARB for regional air quality planning purposes, and is the basis for the region's air quality plans, and includes such sources as *stationary sources* (e.g., fuel combustion, waste disposal/landfills, industrial petroleum production and marketing, and industrial/mineral processes), *area-wide sources* (e.g. cleaning and surface coating, solvent evaporation, and miscellaneous processes such as farming operations, construction/demolition activities, and residential fuel combustion), *mobile sources* (e.g., on-road motor vehicles and other mobile sources such as aircraft, trains, and off-road equipment), and *natural sources* (e.g., biogenic sources, geogenic sources, and wildfires). A summary of emissions of criteria pollutants for 2019 is provided in Table 15-4.

TABLE 15-4 2019 BUTTE COUNTY AIR QUALITY MANAGEMENT DISTRICT AIR QUALITY INVENTORY

	Annual Emissions (Tons Per Year)					
Source Type Subcategory	**ROG**	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Stationary Sources						
Fuel Combustion	0.2445	7.3963	1.5272	0.086	0.1943	0.0996
Petroleum Production and Marketing	0.4704	0.0149	0.0098	0	0.0006	0.0006
Industrial Processes	0.0785	0.0138	0.0583	0.0156	3.1347	0.9085
Waste Disposal	0.2431	0.0219	0.0181	0.0022	0.0512	0.0109
Area-Wide Sources						
Cleaning and Surface Coating	1.0299	0.0004	0.0011	0	0	0
Miscellaneous Processes	3.3178	20.9149	1.12	0.1142	15.0972	4.207
Solvent Evaporation	2.8689	0	0	0	0	0
Mobile Sources						
On-Road Motor Vehicles	1.7535	12.9089	5.2186	0.029	0.3637	0.1695
Other Mobile Sources	2.0584	15.4417	4.7074	0.0365	0.2877	0.2556
Natural Sources						
Natural Sources	142.366	0	0	0.5891	11.0285	9.3449
Butte County Total	**154.431**	**56.7128**	**12.6605**	**0.8726**	**30.1579**	**14.9966**

Notes:
Source: California Air Resources Board 2018, July 18. California Emissions Projection Analysis Model (CEPAM). 2016 SIP Standard Emissions Tool. Emissions Projections By Summary Category Base Year: 2012. https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssum-cat2016.php?_ga=2.54144430.769138297.1613597872-2090683374.1613240111, accessed February 18, 2021.

6. Agricultural Open Burning

Agricultural open burning has been an important waste management tool for farmers as well as forest and wildland managers in Butte County. Such burning helps farmers remove crop residues left in the field after harvesting grains such as rice, wheat or corn, and for orchard prunings and removal. Burning is also helpful in removing weeds, preventing disease, and controlling pests. For some crops, particularly rice, the burning of straw or stubble is the most efficient and effective way to control disease. In the Sacramento Valley, rice has historically accounted for the majority of local agricultural burning, with corn and wheat close behind.

Agricultural burning is not prohibited under state law but CARB and local air districts strictly regulate this activity. As part of the effort to reduce air pollution in the SVAB, agricultural burning is controlled through a process of permits, rules, and regulations. Penalties for violating California air pollution regulations can be expensive—as much as $50,000 per day. Keeping agricultural burning operations within the legal requirements not only avoids costly penalties, but also helps provide a healthier environment for the public.

In addition to a fire agency-issued burn permit, a BCAQMD Burn Permit is required for burning agricultural waste; land clearing waste; or levee, ditch, timber harvesting operations, prescribed burning, and right-of-way clearing waste.. Burning is allowed only on permissive burn days, when forecasted weather conditions create enough air movement to permit good smoke dispersal. CARB determines permissive burn days and the number of acres allocated for agricultural and open burning based on meteorological and air quality factors. When conditions have been met, CARB authorizes burning in the SVAB. Burning is also restricted to certain times of the day. All burn permit holders must comply with local fire protection agency permit requirements.

The BCAQMD handles the day-to-day implementation of the agricultural burning program by issuing burn permits, informing growers and land managers of when and how much they can burn, conducting complaint investigations, conducting enforcement procedures in violation cases, and publishing educational materials on air quality issues.

The Rice Straw Burning Reduction Act was enacted in 1991 by the California Legislature to phase down—but not phase out—burning of rice straw in the Sacramento Valley Air Basin. Beginning in 2001, rice straw burning was limited to 25 percent of the planted acres. To burn, however, growers must show proof of crop loss due to disease, and only 125,000 acres per year will be allocated basinwide. Because of the phase down, growers are seeking alternatives to burning.

Aside from burning related directly to agricultural processes, burning activities in Butte County also pertain to the operation or maintenance of water delivery systems, wildland burning, forest management burning including silviculture and timber operations, and prescribed burning.

7. Residential/Dooryard Open Burning

Residential or "dooryard" burning is the burning of vegetative waste in a 4-foot by 4-foot pile and is regulated by local, state, and federal fire protection agencies as well as the BCAQMD. It is allowed only on permissible burn days, as determined by the

BCAQMD. Before burning in Butte County, individuals must check the burn day status on the day that they are burning by calling 530-332-9407 (toll free: 855-332-9407) or by going to www.bcaqmd.org. Commercial entities are allowed to use open burning if the burning is performed for the purpose of fire hazard reduction to comply with local fire agencies, commercial land clearing for future development and sale or fire hazard reduction.

Only vegetative waste or *clean* dry paper products may be burned in accordance with local fire agency requirements. District Rule 300 and State law prohibit the burning of garbage, tires, trash, construction materials, plastic, bedding or furniture, paint, rubber, cotton, wool, petroleum products, other similar smoke or toxic fume producing items, and fireworks.

CARB has identified smoke and ash from burning residential waste as contributors of toxic air pollutants. As a result, CARB adopted the Residential Waste Burning Airborne Toxic Control Measure. The regulation restricts residential burning statewide to the burning of dry, natural vegetation and prohibits the use of burn barrels. Burn barrels have been prohibited because they were found to contain household garbage that produces toxic smoke and fumes when burned.

8. Wildfires and Air Quality

As a source of air pollution, smoke can pose a threat to human respiratory systems. Smoke particles are very small droplets of condensed organic vapors, unburned fuel, soot, and ash that escape from fire. These can cause and aggravate lung damage, chronic lung disease, and cancer. Smoke contains ozone-forming compounds (volatile organic compounds and oxides of nitrogen) and significant amounts of fine particles and other pollutants. Toxic residue from compounds in smoke can remain in the air for weeks; if inhaled, it can lodge deep in the lungs, causing irritation and coughing.

The major air pollutant of concern during wildfire events is fine particulate matter, also known as $PM_{2.5}$. While all persons may experience varying degrees of symptoms, the more sensitive individuals, such as the young, the elderly, pregnant women, smokers, and those with respiratory conditions, are of greatest risk at experiencing more aggravated symptoms. These symptoms may include, but are not limited to coughing, watery and itchy eyes, and difficulty in breathing.[14]

[14] Butte County Air Quality Management District. 2021, accessed. Wildfires and Air Quality. https://bcaqmd.org/resources-education/wildfires/

16 NOISE

The Butte County General Plan technical setting and trends report provides an overview of the existing noise environment in Butte County and quantifies the current baseline noise conditions in Butte County. Specifically, this involves:

- ♦ Quantifying existing noise levels from major noise sources in the county;
- ♦ Identifying existing land uses that are sensitive to noise, including residential areas, hospitals or healthcare facilities, libraries, parks and schools; and
- ♦ Identifying conflicts between existing noise sources and noise-sensitive uses.

The Noise Baseline Report prepared by Bollard & Brennan in 2005 is the basis for this report. A community noise survey was conducted by Bollard & Brennan in 2005 and included short- and long-term noise measurements at locations throughout the county. For the 2021 update to the Setting and Trends Report, information has been updated to include new traffic and rail noise modeling based on the most recent data.

A. Noise Terminology

This section defines and describes various terms and concepts commonly used in noise analysis, and relevant to the information presented in following sections of this chapter.

1. Sound, Noise, and Acoustics

Sound is a disturbance that is created by a moving or vibrating source in a gaseous or liquid medium or the elastic stage of a solid and that is capable of being detected by the hearing organs. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium to a hearing organ, such as a human ear. For traffic sound, the medium is air. *Noise* is defined as loud, unpleasant, unexpected, or undesired sound.

The source, path, and receiver are all important to how noise is perceived and its effect on communities.

2. Frequency and Hertz

A continuous sound can be described by its frequency (pitch) and its amplitude (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch, like the low notes on a piano, whereas high-frequency sounds are high in pitch, like the high notes on a piano. Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of hertz. The extreme range of frequencies that can be heard by the healthiest human ears spans from 16 to 20 Hz on the low end to about 20,000 Hz (20 kHz) on the high end.

3. Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases and decreases with increasing and decreasing amplitude. Sound pressure amplitude is measured in units of micro-Pascals (μPa). One μPa is approximately one- hundred billionth (0.00000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million μPa, or 10 million times the pressure of the weakest audible sound (20 μPa). Because expressing sound levels in terms of μPa would be cumbersome, sound pressure level (SPL) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called bels, named after Alexander Graham Bell. To provide finer resolution, a bel is divided into 10 decibels (dB).

4. Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted by ordinary arithmetic means. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. When two sounds of equal SPL are combined, they produce a combined SPL that is 3 dB greater than the original individual SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sound levels differ by 10 dB or more, the combined SPL is effectively equal to the higher SPL; the lower sound level would not increase the higher sound level.

5. A-Weighted Decibels

SPL alone is not a reliable indicator of loudness. The frequency of a sound also has a substantial effect on how humans respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, the healthy human ear is most sensitive to sounds from 1,000 to 5,000 Hz and perceives a sound within that range as being more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of SPL adjustments is usually applied to the sound measured by a sound level meter. The adjustments, referred to as a weighting network, are frequency-dependent.

The A-scale weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Noise levels for environmental noise studies are typically reported in terms of A-weighted decibels (dBA). In environmental noise studies, A-weighted SPLs are commonly referred to as noise levels. Table 16-1 shows typical A-weighted noise levels.

6. Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern 1 dBA changes in sound levels when exposed to steady, single-frequency ("pure tone") signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect 2 dBA changes in normal environmental noise. However, it is widely accepted that the average healthy ear can barely perceive 3 dBA noise level changes. A 5 dBA change is readily perceptible, and a 10 dBA change is perceived as being twice or half as loud. As discussed above, doubling sound energy results in a 3 dBA increase in sound; therefore, doubling sound energy (e.g., doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

7. Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in environmental noise analysis:

- *Equivalent sound level (L_{eq}):* L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period. The one-hour A-weighted equivalent sound level (L_{eq}[h]) is the energy average of the A-weighted sound levels occurring during a one-hour period.

- *Percentile-exceeded sound level (L_x):* L_x represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, L_{90} is the sound level exceeded 90 percent of the time).

- *Maximum sound level (L_{max}):* L_{max} is the highest instantaneous sound level measured during a specified period.

- *Day-night level (L_{dn}):* L_{dn} is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m.

- *Community noise equivalent level (CNEL):* CNEL is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m. and 5 dB added to the A-weighted sound levels occurring between 7:00 p.m. and 10:00 p.m.

TABLE 16-1 TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)[1]	Common Indoor Activities
Onset of physical discomfort	120+	
	115	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet	105	
	100	
Gas Lawn Mower at three feet	95	
	90	
Diesel Truck at 50 feet, at 50 mph	85	Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime	75	
	70	Vacuum Cleaner at 10 feet
Commercial Area	65	Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
	55	Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
	45	
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime	35	
	30	Library
Quiet Rural Nighttime	25	Bedroom at Night, Concert Hall (background)
	20	
	15	Broadcast/Recording Studio
	10	
	5	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: California Department of Transportation (Caltrans), 2013. Technical Noise Supplement (“TeNS”).

8. Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors:

- *Geometric Spreading*: Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates (or drops off) at a rate of 6 dBA for each doubling of distance. Highway noise is not a single, stationary point source of sound. The movement of the vehicles on a highway makes the source of the sound appear to emanate from a line (i.e., a line source) rather than a point. This line source results in cylindrical spreading rather than the spherical spreading that results from a point source. The change in sound level from a line source is 3 dBA per doubling of distance.

- *Ground Absorption*: The noise path between the highway and the observer is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation also has been expressed in terms of attenuation per doubling of distance. This approximation is done for simplification only because prediction results based on this scheme are sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., those sites with a reflective surface, such as a parking lot or a smooth body of water, between the source and the receiver), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, between the source and the receiver), an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. When added to the geometric spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dBA per doubling of distance for a line source and 7.5 dBA per doubling of distance for a point source.

- *Atmospheric Effects*: Atmospheric conditions can have a significant effect on noise propagation. Wind has been shown to be the most important meteorological factor within approximately 500 feet of the source, whereas vertical air-temperature gradients are more important for greater distances. Other factors, such as air temperature, humidity, and turbulence, also have significant effects. Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lower noise levels. Increased sound levels can also occur as a result of temperature inversion conditions (i.e., increasing temperature with elevation).

- *Shielding by Natural or Human-Made Features*: A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by this shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line-of-sight between a source and a receiver will typically result in at least 5 dBA of noise reduction. A taller barrier may provide as much as 20 dBA of noise reduction.

B. Regulatory Framework

1. Federal Regulations

The federal Noise Control Act of 1972 (Public Law 92 574) established a requirement that all federal agencies administer their programs to promote an environment free of noise that would jeopardize public health or welfare. The U.S. Environmental Protection Agency (EPA) was given the responsibility for:

- Providing information to the public regarding identifiable effects of noise on public health and welfare;
- Publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety;
- Coordinating federal research and activities related to noise control; and
- Establishing federal noise emission standards for selected products distributed in interstate commerce.

The Noise Control Act also directed that all federal agencies comply with applicable federal, state, interstate and local noise control regulations.

Although the EPA was given major roles in disseminating information to the public and coordinating federal agencies, each federal agency retains authority to adopt noise regulations pertaining to agency programs. The EPA, however, can require other federal agencies to justify their noise regulations in terms of Noise Control Act policy requirements. The Occupational Safety and Health Administration retains primary authority for setting workplace noise exposure standards, the Federal Aviation Administration retains primary jurisdiction over aircraft noise standards, the Federal Highway Administration (FHWA) retains primary jurisdiction over highway noise standards, and the Federal Transit Administration (FTA) retains primary jurisdiction over transit and rail noise standards.

In 1974, in response to the requirements of the Noise Control Act, the EPA identified indoor and outdoor noise limits to protect public health and welfare (e.g., communication disruption, sleep disturbance and hearing damage). Day-night average sound level (L_{dn}) limits of 55 dB outdoors and 45 dB indoors are identified as desirable to protect against speech interference and sleep disturbance for residential, educational, and healthcare areas. Sound level criteria identified to protect against hearing damage in commercial and industrial areas are 24-hour L_{eq} values of 70 dB (both outdoors and indoors).

a. Federal Highway Administration

Title 23, part 772, of the Code of Federal Regulations (CFR) "Procedures for Abatement of Highway Traffic Noise" provides procedures for conducting noise studies for highway projects and implementing noise abatement measures to help to protect the public health and welfare; supplies noise abatement criteria (NAC); and establishes requirements for information to be given to local officials for use in planning and designing highways. Under this regulation, noise abatement must be considered for highway construction projects if they are predicted to result in a traffic noise impact. Such an impact is considered to occur when the project results in a substantial noise increase or when the predicted noise levels approach or exceed the NAC specified in the regulation. 23 CFR 772 does not specifically define the term *approach* or what constitutes a substantial increase; instead, it leaves interpretation of these terms to the states. Table 16-2 summarizes NAC specified in 23 CFR 772.

TABLE 16-2 ACTIVITY CATEGORIES AND NOISE ABATEMENT CRITERIA

Activity Category	NAC, Hourly A-Weighted Noise Level (dBA, L_{eq}[h])	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 Exterior	Residential
C	67 Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studies, recording studios, schools, and television studios
E	72 Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F
F	—	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	—	Undeveloped lands that are not permitted

b. U.S. Department of Housing and Urban Development

The United States Department of Housing and Urban Development (HUD) has set a goal of 65 dBA L_{dn} as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted by the State of California.) While HUD does not specify acceptable interior noise levels, standard construction of residential dwellings typically provides exceeding 20 dBA of attenuation with the windows closed. Based on this premise, the interior L_{dn} should not exceed 45 dBA.

c. Federal Transit Administration FTA

FTA procedures for the evaluation of noise from transit projects are specified in the document titled *Transit Noise and Vibration Impact Assessment.*[1] The FTA noise impact criteria group noise-sensitive land uses into the following three categories:

- Category 1: Buildings or parks where quiet is an essential element of their purpose.
- Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals and hotels where nighttime sensitivity is assumed to be of utmost importance.
- Category 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches, and active parks.

L_{dn} is used to characterize noise exposure for residential areas (Category 2). For other noise-sensitive land uses, such as outdoor amphitheaters and school buildings (Categories 1 and 3), the maximum 1-hour L_{eq} during the facility's operating period is used.

There are two levels of impact included in the FTA criteria. The interpretation of these two levels of impact is summarized below:

Impact: In this range of noise impacts, sometimes referred to as moderate impacts, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase compared with existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation and the cost-effectiveness of mitigating noise to more acceptable levels.

- *Severe Impacts:* Severe noise impacts are considered "significant" as this term is used in the National Environmental Policy Act (NEPA) and implementing regulations.[2] Noise mitigation normally will be specified for severe impact areas unless there is no practical method of mitigating the noise.

[1] Federal Transit Administration, 2018. *Transit Noise and Vibration Impact Assessment Manual.*

[2] Federal Transit Administration, 2018. *Transit Noise and Vibration Impact Assessment Manual.*

2. State Regulations

In general, the purpose of the General Plan Noise Element is to serve as a guide for establishing a pattern of land uses that minimizes the exposure of community residents to excessive noise. California Government Code Section 65302(f) specifies the required contents of the General Plan Noise Element and states that it shall quantify current and projected noise levels for the following sources:

- Highways and freeways;
- Primary arterial and major local streets;
- Passenger and freight on-line railroad operation and ground rapid-transit systems;
- Commercial, general aviation, heliport, helistop and military airport operations;
- Aircraft overflights;
- Jet engine test strands;
- All other ground facilities and maintenance functions related to airport operations;
- Local industrial plants, including railroad classification yards; and
- Other ground stationary noise sources identified by local agencies as contributing to the community noise environment.

a. California General Plan Guidelines

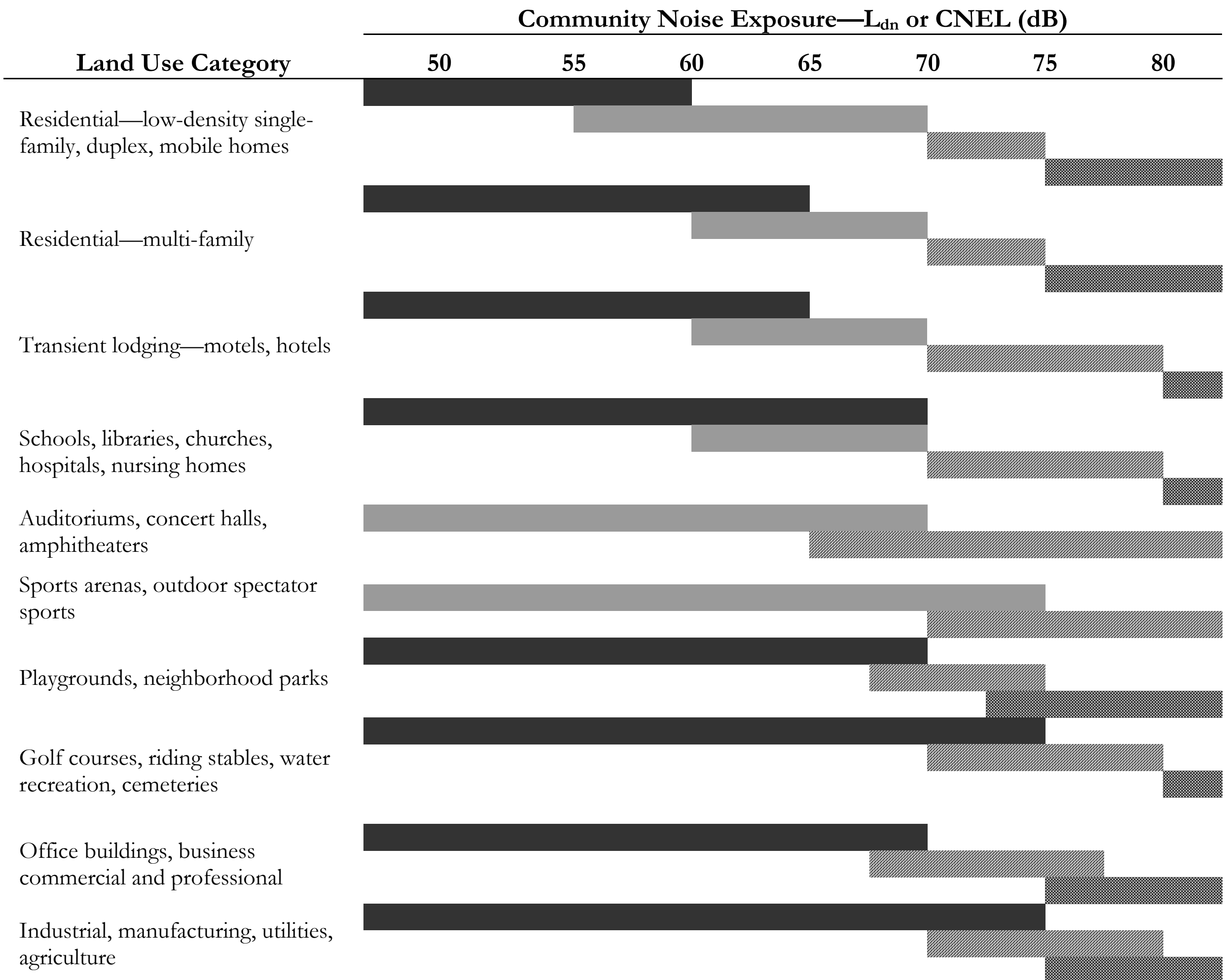
The State of California General Plan Guidelines[3] provide guidance to be used in development of the General Plan Noise Element in accordance with the requirements of California Government Code Section 65302(f).

These guidelines include a sound level/land use compatibility chart that divides various outdoor L_{dn} ranges into four compatibility categories based on land use: normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. For many land uses, the chart shows overlapping L_{dn} ranges for two or more categories. These overlapping L_{dn}

[3] Governor's Office of Planning and Research, 2017. *State of California General Plan Guidelines*.

ranges are intended to indicate that local conditions (existing sound levels and community attitudes toward dominant sound sources) should be considered in evaluating land use compatibility at specific locations. Land use compatibility standards defined in the General Plan Guidelines are illustrated in Table 16-3.

TABLE 16-3 STATE LAND USE COMPATIBILITY STANDARDS FOR COMMUNITY NOISE ENVIRONMENT



Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made, and needed noise insulation features must be included in the design.

Clearly Unacceptable: New construction or development generally should not be undertaken.

CNEL=Community noise equivalent level.
Source: Governor's Office of Planning and Research 2017.

b. California Noise Insulation Standards

The California Building Code (CBC) is Title 24 of the California Code of Regulations. CBC Part 2, Volume 1, Chapter 12, Section 1207.11.2, Allowable Interior Noise Levels, requires that interior noise levels attributable to exterior sources not exceed 45 dBA in any habitable room. The noise metric is evaluated as either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), whichever is consistent with the noise element of the local general plan.

The State of California's noise insulation standards for non-residential uses are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 11, California Green Building Standards Code (CALGreen). CALGreen noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Proposed projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings for the wall and roof-ceiling assemblies and exterior windows when located within a noise environment of 65 dBA CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dBA Leq(1hr).

c. Airport Noise Standards

California Code of Regulations Title 21, Subchapter 6, Airport Noise Standards, establishes 65 dBA CNEL as the acceptable level of aircraft noise for persons living in the vicinity of airports. Noise-sensitive land uses are generally incompatible in locations where the aircraft exterior noise level exceeds 65 dBA CNEL, unless an aviation easement for aircraft noise has been acquired by the airport proprietor or the residence is a high-rise with an interior CNEL of 45 dBA or less in all habitable rooms and an air circulation or air conditioning system, as appropriate. Assembly Bill (AB) 2776 requires any person who intends to sell or lease residential properties in an airport influence area to disclose that fact to the person buying the property.

3. Local Regulations

a. Noise Element of the General Plan

The current Noise Element of the County's General Plan establishes objectives and implements policies intended to limit community exposure to excessive noise levels. The Butte County General Plan 2030 Health and Safety Element (adopted in 2010) identified noise sources such as roadways, rails and airports within the county. Noise land use compatibility standards from the Health and Safety Element are summarized in Table 16-4.

TABLE 16-4 MAXIMUM ALLOWABLE NOISE EXPOSURE TO TRANSPORTATION NOISE SOURCES

	Exterior Noise Level Standard for Outdoor Activity Areas[a]		Interior Noise Level Standard	
Land Use	**L_{dn}/CNEL, L_{eq}, dB**	**dBA[b]**	**L_{dn}/CNEL, L_{eq}, dB**	**dB[b]**
Residential	60[c]	--	45	--
Transient lodging	60[c]	--	45	--
Hospitals, nursing homes	60[c]	--	45	--
Theaters, auditoriums, music halls	--	--	--	35
Churches, meeting halls	60[c]	--	--	40
Office buildings	--	--	--	45
Schools, libraries, museums	--	70	--	45
Playgrounds, neighborhood parks	--	70	--	--

Note: -- = not applicable.
[a] Where the location of outdoor activity areas is unknown, the exterior noise-level standard shall be applied to the property line of the receiving land use.
[b] As determined for a typical worst-case hour during periods of use.
[c] Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed, provided that available exterior noise-level reduction measures have been implemented and interior noise levels are in compliance with this table.

b. County Noise Ordinance

Chapter 41A of the Butte County Code or Ordinances contains exterior noise standards, which are summarized in Table 16-5.

TABLE 16-5 MAXIMUM ALLOWABLE NOISE EXPOSURE TO NON-TRANSPORTATION SOURCES

	Daytime 7 a.m. – 7 p.m.		Evening 7 p.m. – 10 p.m.		Night 10 p.m. – 7 a.m.	
Noise Level Description	**Urban**	**Non-Urban**	**Urban**	**Non-Urban**	**Urban**	**Non-Urban**
Hourly L_{eq}, dB	55	50	50	45	45	40
Maximum Level, dB	70	60	60	55	55	50

Notes:
"Non-Urban designations" are Agriculture, Timber Mountain, Resource Conservation, Foothill Residential and Rural Residential. All other designations are considered "urban designations" for the purposes of regulating noise exposure.
Each of the noise limits specified above shall be reduced by 5 dBA for recurring impulsive noise, simple or pure tone noise, or for noises consisting of speech or music.
Noise level standards up to 5 dBA less than those specified above, based upon determination of existing low ambient noise levels in the vicinity of the project site may be imposed.
In urban areas, the exterior noise level standard shall be applied to the property line of the receiving property. In non-urban areas, the exterior noise level standard shall be applied at a point 100 feet away from the residence or at the property line if the residence is closer than 100 feet. The above standards shall be measured only on property containing a noise sensitive land use.

C. Noise Sensitive Land Uses

This section describes the existing noise environment in Butte County, including the location of noise-sensitive land uses and major mobile and stationary noise sources.

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Places where people live, sleep, recreate, worship and study generally are considered sensitive to noise because intrusive noise can be disruptive to these activities. Specific areas considered sensitive to noise include:

- Residences
- Hospitals or healthcare facilities
- Parks and wildlife areas
- Places of worship
- Libraries
- Schools

These areas in the county are identified and discussed in the following sections. Chapter 1 of this Setting and Trends Report also provides discussion of the general location of existing land uses, including residential areas.

a. Residences

Butte County is an urban and rural county, with most of the population concentrated in the urban areas around Chico, Paradise, and Oroville. Two smaller cities, Biggs and Gridley, and a number of smaller communities, including Durham, Palermo and Berry Creek, also are located in the county. Outside these communities there are scattered individual dwellings.

b. Hospitals and Healthcare Facilities

There are four hospitals in Butte County, including Biggs-Gridley Memorial Hospital in Gridley, Enloe Medical Center in Chico, Feather River Hospital in Paradise, and Oroville Hospital in Oroville.

c. Parks, Wildlife Areas, and Recreation Areas

The locations of Butte County's public parks, wildlife area and recreation area are described in Chapter 8, Recreation.

d. Places of Worship

There are numerous churches, synagogues, and other places worship throughout Butte County.

e. Libraries

There are nine libraries in Butte County; including one each in the communities of Biggs, Durham, Paradise, and Gridley; three in Chico; and two in Oroville.

f. Schools

There are over 70 elementary, middle, high and adult schools in Butte County, and three college campuses.

D. Major Mobile Noise Sources

This section describes the major mobile transportation-related noise sources in the County, including roads, railways, and airport operations.

As described above, the CNEL and L_{dn} are 24-hour average noise level descriptors. This assumes that individuals are more sensitive to noise occurring during the evening and nighttime hours. The CNEL and L_{dn} descriptors have been found to provide good correlation to the potential for annoyance from transportation-related noise sources (e.g., roadways, airports and, to a lesser extent, railroad operations).

1. Roadway Noise Levels

The FHWA Highway Traffic Noise Prediction Model (FHWA-RD 77-108) was used to develop L_{dn} (24-hour average) noise contours for all highways and major roadways in the General Plan study area. The model uses noise emission factors for automobiles, medium-duty trucks, and heavy-duty trucks, with consideration given to vehicle volume, speed, number of lanes, distance to the receiver and the acoustical characteristics of the site.

Traffic data representing average daily traffic (ADT) volumes, vehicle mix, and day/night distribution for existing conditions were obtained from Fehr & Peers for the year 2018. The traffic noise levels, as defined by L_{dn}, were calculated for existing traffic volumes. Distances from the centerlines of selected roadways to the 60, 65, and 70 dBA L_{dn} noise contours are summarized in Table 16-6.

TABLE 16-6 EXISTING (2018) TRAFFIC NOISE LEVELS IN BUTTE COUNTY

Roadway	Segment	ADT	Ldn (dBA) at 50 Feet	Distance to Noise Contour 70 dBA Ldn	65 dBA Ldn	60 dBA Ldn
SR 32	Muir Ave. to East Ave.	13,500	69.0	43	92	198
32	East Ave. to W. Sacramento Ave.	21,500	68.4	39	84	182
S32	W. Sacramento Ave. to W. 1st St.	20,500	67.8	36	77	166
32	W. 1st St. to W. 5th St.	24,000	68.7	41	88	191
S32	W. 5th St. to 8th/9th/Walnut St.	22,300	68.5	40	85	184
32	8th St. (One way WB), Walnut to Main St.	13,900	66.6	30	64	137
32	9th St. (One way EB), Walnut to Main St.	9,900	64.7	22	48	104
32	8th St. (WB), Main St. to SR 99	16,800	67.0	32	68	147
SR32	9th St. (EB), Main St. to SR 99	16,900	67.4	34	72	156
32	SR99 to Yosemite Dr.	17,600	70.4	53	115	248
32	Yosemite Dr. to Humboldt Rd. (Hog Springs)	5,250	66.2	28	60	129
32	Humboldt Rd. (H.S.) to Robert E. Lee Dr. (F.R.)	3,400	64.3	21	45	96
SR 70	Yuba County Line to Lower Honcut Rd.	15,200	73.5	86	185	399
SR 70	Lower Honcut Rd. to East Gridley Rd.	15,000	73.5	85	184	396
SR 70	East Gridley Rd. to Palermo Rd.	17,000	74.7	102	220	474
SR 70	Palermo Rd. to SR 162	16,900	74.5	100	215	462
SR70	SR 162 to Montgomery St.	22,700	75.8	122	263	567
SR70	Montgomery St. to Grand Ave.	28,900	76.9	144	311	669
SR70	Grand Ave. to SR 149	26,200	76.5	135	291	628
SR 70	SR 149 to SR 191	8,050	68.4	39	85	182
SR 70	SR 191 to Pentz Rd.	3,400	64.3	21	45	96
SR 70	Pentz Rd. to Big Bend Rd. (Concow)	2,100	62.3	15	33	71
SR 99	Sutter County line to Archer Ave.	16,500	71.8	66	143	308
SR 99	Archer Ave. to Spruce St. (Gridley)	23,900	68.7	41	88	189
SR 99	Spruce St. to East Biggs Hwy.	14,400	71.6	64	139	298
SR99	East Biggs Hwy. SR 162 (East)	12,000	71.2	60	130	279

Roadway	Segment	ADT	Ldn (dBA) at 50 Feet	Distance to Noise Contour 70 dBA Ldn	65 dBA Ldn	60 dBA Ldn
SR 99	SR 162 to (East) to SR 149	10,900	70.4	53	115	248
SR 99	SR 149 to Durham - Pentz Rd.	27,100	76.6	137	295	636
SR 99	Durham - Pentz Rd. to Skyway	39,000	78.3	178	384	828
SR 99	Skyway to East 20th St.	60,000	80.1	235	505	1089
SR 99	East 20th St. to SR 32	76,000	81.1	274	589	1270
SR 99	SR 32 to Cohasset Rd.	66,400	80.5	249	537	1158
SR 99	Cohasset Rd. to East Ave.	46,500	78.8	194	419	902
SR 99	East Ave. to Eaton Rd.	33,500	77.4	156	336	724
SR 99	Eaton Rd. to Keefer Rd.	18,100	73.3	83	179	386
SR 149	SR 70 to SR 99	18,900	75.0	108	233	502
SR 162	Glenn County line to SR 99 (south intersect)	1,600	56.2	6	13	28
SR 162	SR 99 (north intersect) to Larkin Rd.	2,600	67.6	34	74	160
SR 162	Larkin Rd. to SR 70	13,800	67.0	32	68	147
SR 162	SR 70 to Feather River Blvd.	31,500	70.1	51	109	235
SR 162	Feather River Blvd. to Lincoln Blvd.	30,000	70.0	50	108	232
SR 162	Lincoln Blvd. to Olive Hwy.	30,500	70.2	51	111	239
SR 162	Olive Hwy. to Lower Wyandotte Rd.	30,500	68.0	37	79	171
SR 162	Lower Wyandotte Rd. to Foothill Blvd.	29,000	72.5	73	158	340
SR 162	Foothill Blvd. to Canyon Dr.	12,200	68.3	38	83	178
SR 162	Canyon Dr. to Forbestown Rd.	6,200	63.9	19	42	90
SR 191	SR 70 to Durham-Pentz Rd.	5,000	62.5	16	34	73
SR 191	Durham-Pentz Rd. to Airport Rd.	5,600	62.6	16	35	75
SR 191	Airport Rd. to Bushmann Rd.	5,900	62.8	17	36	77
SR 191	Buschmann Rd. to Pearson Rd.	9,200	64.7	22	48	103
Aguas Frias Rd.	Durham-Dayton Rd. to Grainland Ave.	742	48.2	2	4	8
Aguas Frias Rd.	Grainland Ave. to SR 162	583	47.6	2	3	7

Roadway	Segment	ADT	Ldn (dBA) at 50 Feet	Distance to Noise Contour 70 dBA Ldn	65 dBA Ldn	60 dBA Ldn
Biggs East Hwy.	Biggs to SR 99	2,319	59.1	9	20	43
Biggs East Hwy.	SR 99 to Larkin Rd.	2,753	60.5	12	25	54
Clark Rd.	Wagstaff Rd. to Skyway	10,519	64.8	22	48	104
Cohasset Rd.	SR 99 to East Ave.	22,065	70.7	55	119	257
Cohasset Rd.	East Ave. to Lupin Rd.	18,364	70.0	50	107	231
Cohasset Rd.	E. Easton Rd. to Boeing Dr.	10,222	66.5	29	63	135
Cohasset Rd.	Lassen Ave. to Boeing Dr. (Chico M. Airport)	12,500	67.5	34	73	158
Cohasset Rd.	Boeing Dr. to Keefer Rd.	3,000	62.0	15	31	68
Cohasset Rd.	Keefer Rd. to Vilas Rd.	1,562	56.3	6	13	28
Colusa Hwy.	Colusa County line to Pennington Rd.	669	52.4	3	7	15
Colusa Hwy.	Pennington Rd. to Biggs Gridley Rd.	3,546	59.7	10	22	48
Colusa Hwy.	Biggs Gridley Rd. to SR 99	3,273	61.7	14	30	65
Dayton Rd.	SR 32 to Hegan Ln.	6,096	65.7	26	56	120
Dayton Rd.	Hegan Ln. to Rodgers Ave.	3,059	62.3	15	33	72
Durham-Dayton Hwy.	Dayton Rd. to Midway	4,300	60.7	12	26	55
Durham-Dayton Hwy.	Midway to Stanford Ln.	2,000	59.2	10	21	44
Durham-Dayton Hwy.	Stanford Ln. to SR 99	2,239	62.2	15	32	70
Durham–Pentz Rd.	SR 99 to SR 191	9,417	67.3	33	71	153
Durham–Pentz Rd.	SR 191 to Pentz Rd.	2,283	57.9	8	17	36
East Ave. - Manzanita Ave. - Bruce Ave.	SR 32 to Cussick Ave.	16,355	69.9	49	106	229
East Ave. - Manzanita Ave. - Bruce Ave.	Cussick Ave. to Esplanade	23,814	71.7	65	139	300
East Ave. - Manzanita Ave. - Bruce Ave.	Esplanade to SR 99	24,468	68.7	41	89	191
East Ave. - Manzanita Ave. - Bruce Ave.	SR 99 to Cohasset Rd.	13,353	66.3	28	61	132
East Ave. - Manzanita Ave. - Bruce Ave.	Floral Ave. to Coleman Ct.	18,036	69.3	45	97	209
East Ave. - Manzanita Ave. - Bruce Ave.	Floral Ave. to Mariposa Ave.	17,500	69.2	44	95	204
East Ave. - Manzanita Ave. - Bruce Ave.	Mariposa Ave. to Marigold Ave.	10,000	66.9	31	67	143

Roadway	Segment	ADT	Ldn (dBA) at 50 Feet	Distance to Noise Contour 70 dBA Ldn	65 dBA Ldn	60 dBA Ldn
East Ave. - Manzanita Ave. - Bruce Ave.	Marigold Ave. to Manzanita Ave.	10,000	67.4	33	72	155
East Ave. - Manzanita Ave. - Bruce Ave.	East Ave. to Vallombrosa Ave.	11,858	68.6	41	87	188
East Ave. - Manzanita Ave. - Bruce Ave.	California Park Dr. to SR 32	11,363	68.4	39	84	180
East Gridley Rd.	SR 99 to Larkin Rd.	6,038	63.0	17	37	79
East Gridley Rd.	Larkin Rd. to SR 70	5,500	62.6	16	35	74
Eaton Rd.	Esplanade to SR 99	16,834	70.3	53	114	245
Eaton Rd.	SR 99 to Hicks Ln.	9,500	67.6	34	74	160
Eaton Rd.	Hicks Ln. to Cohasset Rd.	9,728	67.7	35	75	163
Esplanade	SR 99 to Garner Ln.	1,000	57.4	7	16	33
Esplanade	Garner Ln. to Eaton Rd.	12,981	70.0	50	107	231
Esplanade	Eaton Rd. to Lassen Ave.	15,539	67.4	33	72	155
Esplanade	Lassen Ave. to East Ave.	22,622	68.8	42	90	194
Esplanade	East Ave. to Cohasset Rd.	20,558	68.5	40	86	185
Esplanade	Cohasset Rd. to E. 9th Ave.	24,099	69.5	47	100	216
Esplanade	E. 2nd Ave. to E. Sacramento Ave.	22,206	70.9	58	124	267
Esplanade	E. Sacramento Ave. to Main St./Broadway	20,748	70.1	51	109	235
Main St. (NB)	Esplanade/E. 1st St. to 9th St.	10,724	66.8	31	66	142
Broadway (SB)	Esplanade/E. 1st St. to 9th St.	8,638	63.4	18	39	84
Park Ave.	E. 9th St. to 16th St.	18,405	67.6	35	75	161
Park Ave.	E. 16th St. to E. 20th St.	17,988	67.6	34	74	160
Park Ave.	E. 20th St. to East Park Ave.	12,136	65.6	25	55	118
E. Park Ave.	Park Ave. to SR 99	18,760	67.2	32	70	150
Forbestown Rd.	SR 162 to Lumpkin Rd.	3,154	59.3	10	21	45
Hegan Ln.	Dayton Rd. to S.P. Railroad tracks	3,454	63.0	17	37	79
Hegan Ln.	S.P. Railroad tracks to Midway	11,061	69.1	44	94	202
Honey Run Rd.	Skyway to Centerville Rd.	1,500	54.1	4	9	20

Roadway	Segment	ADT	Ldn (dBA) at 50 Feet	Distance to Noise Contour 70 dBA Ldn	65 dBA Ldn	60 dBA Ldn
Centerville Rd.	Skyway to Honey Run Rd.	1,404	53.8	4	9	19
Nimshew Rd.	Centerville to Skyway	500	47.0	1	3	7
Larkin Rd.	SR 162 to E. Hamilton Rd.	4,603	64.4	21	46	98
Larkin Rd.	E. Hamilton Rd. to East Biggs Hwy.	2,968	64.2	20	44	95
Larkin Rd.	East Biggs Hwy. to E. Gridley Hwy.	1,327	61.4	13	29	62
Larkin Rd.	E. Evans Reimer Rd. to County line	2,954	63.2	18	38	81
Lincoln Blvd.	SR 162 to Marysville Baggett Rd.	12,713	66.6	30	64	139
Lincoln Blvd.	Marysville Baggett Rd. to Monte Vista Ave.	11,618	66.7	30	65	140
Lincoln Blvd.	Monte Vista Ave. to Ophir Rd.	7,200	66.8	30	66	141
Lincoln Blvd.	Ophir Rd. to Palermo Rd.	5,890	65.7	26	55	119
Lower Honcut Rd.	SR 70 to Palermo Honcut Hwy.	1,058	54.7	5	10	22
Lower Honcut Rd.	Palermo Honcut Hwy. to LaPorte Rd.	500	51.2	3	6	13
LaPorte Rd.	Lower Honcut Rd. to Oro-Bangor Hwy.	1,000	54.3	4	10	21
Lower Wyandotte Rd.	SR 162 to Oro-Bangor Hwy.	7,748	64.3	21	45	96
Lower Wyandotte Rd.	Oro-Bangor Hwy. to Ophir Rd.	6,000	68.6	40	87	187
Lower Wyandotte Rd.	Ophir Rd. to Foothill Blvd.	7,025	67.3	33	71	154
Upper Palermo Rd.	Ophir Rd. to Palermo Rd.	3,638	65.8	26	57	122
Palermo Honcut Hwy.	Palermo Rd. to Lower Honcut Rd.	1,000	59.9	11	23	49
Midway	East Park Ave. to Hegan Ln.	16,862	71.1	59	127	273
Midway	Hegan Ln. to Durham-Dayton Rd.	9,116	68.4	39	85	183
Montgomery St.	SR 70 to Lincoln Blvd.	6,802	63.9	20	42	91
Montgomery St.	Lincoln Blvd. to Table Mountain Blvd.	6,574	63.1	17	37	80
Oroville - Bangor Hwy.	Lincoln Blvd. to Lower Wyandotte Rd.	1,867	52.7	3	8	16
Oroville - Bangor Hwy.	Lower Wyandotte Rd. to Foothill Blvd.	2,000	58.2	8	18	38
Oroville - Bangor Hwy.	Foothill Blvd. to Swedes Flat Rd.	1,594	54.4	5	10	21
Oroville - Bangor Hwy.	N/O Swedes Flat Rd.	2,073	57.7	8	16	35

Roadway	Segment	ADT	Ldn (dBA) at 50 Feet	Distance to Noise Contour 70 dBA Ldn	65 dBA Ldn	60 dBA Ldn
Palermo Rd.	Upper Palermo Rd. to Lincoln Blvd.	1,200	60.9	12	27	57
Palermo Rd.	Lincoln Blvd. to Lone Tree Rd.	1,100	60.9	12	27	57
Palermo Rd.	Lone Tree Rd. to SR 70	1,179	61.1	13	27	59
Pentz Rd.	SR 70 to Messilla Valley Rd.	3,507	60.0	11	23	50
Pentz Rd.	Malibu Dr. to De Mille Rd.	4,301	61.1	13	27	59
Skyway	SR 99 to Notre Dame Blvd.	31,404	70.2	52	111	240
Skyway	Notre Dame Blvd. to Bruce Rd.	22,455	68.5	40	86	185
Skyway	Bruce Rd. to Honey Run Rd.	21,879	68.4	39	84	181
Skyway	Honey Run Rd. to Neal Rd.	19,392	70.4	53	115	247
Skyway	Neal Rd. to Pearson Rd.	22,253	68.4	39	84	181
Skyway	Pearson Rd. to Bille Rd.	20,341	67.9	36	78	169
Skyway	Bille Rd. to Wagstaff Rd.	12,246	65.4	25	53	115
Skyway	Wagstaff Rd. to Clark Rd.	10,252	64.6	22	47	102
Skyway	Clark Rd. to Pentz Rd.	15,450	66.5	29	63	136
Skyway	Pentz Rd. to S. Park Rd.	16,125	66.7	30	65	140
Skyway	Nimshew Rd. to Shawnee Ln.	1,659	56.5	6	14	29
Skyway	Nimshew Rd. to Lovelock Rd.	415	50.5	3	5	12
Skyway	Lovelock Rd. to Powellton Rd.	583	52.1	3	7	15
Table Mountain Blvd.	Montgomery St. to County Center Dr.	13,249	66.3	28	61	132
Table Mountain Blvd.	Nelson Ave. to County Center Dr.	5,239	65.9	27	58	124
Ophir Rd.	East of Feather River Blvd.	6,393	66.1	28	59	128
Foothill Blvd.	South of SR 162	5,771	62.0	15	32	68
Miners Ranch Rd.	South of SR 162	3,025	62.6	16	35	74

Source: Based on FHWA's traffic noise prediction model methodology using roadway volumes, vehicle mix, time of day splits, and number of lanes provided by Fehr & Peers, 2021

In many cases, the actual distances to noise level contours at individual locations may vary from the distances predicted by the FHWA model. Factors such as roadway curvature, roadway grade, shielding from local topography or structures, elevated roadways, or elevated receivers may affect actual sound propagation.

The distances reported in Table 16-6 are considered conservative estimates of noise exposure along roadways in Butte County, suitable for a planning level document such as the General Plan.

Table 16-7 has been prepared to serve as a guide when applying the traffic noise exposure contour information presented in this section to areas with varying topography. The table is used by adding the correction factor to the noise level predicted at a given distance. It should be noted that the adjustment factors presented in this table are intended to provide conservative (worst case) results and that complex situations should be evaluated by an acoustical consultant where the potential for significant noise impact exists.

TABLE 16-7 TRAFFIC NOISE ADJUSTMENTS FOR VARIOUS TOPOGRAPHIC CONDITIONS

	Distance from Center of Roadway (Feet)		
Topographic Situation	<200	200 - 400	>400
Hillside overlooks roadway	-0-	+1 dB	+3 dB
Roadway Elevated (>15 feet)	-5 dB	-2 dB	-0-
Roadway in cut/below embankment	-5 dB	-5 dB	-5 dB
Dense vegetation (100 feet or more)	-5 dB	-5 dB	-5 dB

Source: Bollard & Brennan, 2005

Additionally, site-specific studies may be needed to determine more localized conditions pertaining to an individual site or project. In such studies, the effects of factors such as roadway curvature and grade can be determined from site-specific traffic noise measurements. The noise measurement results can be compared to the FHWA model results by entering the observed traffic volumes, speed, and distance as inputs to the FHWA model. The differences between the measured and predicted noise levels can be used to adjust the FHWA model and more precisely determine the locations of the traffic noise contours.

2. Railroad Noise

There are two main railroad lines that go through Butte County – both owned and operated by Union Pacific Railroad (UPRR). The UPRR line that runs parallel to State Route 99 is the Valley Subdivision; the UPRR line that parallels the Feather River to the east is split into two subdivisions. The Sacramento Subdivision runs from the Butte County boundary to Oroville and then it becomes the Canyon Subdivision as it continues from Oroville along the Feather River. It is also called the Feather River Route. Train traffic on both lines consists entirely of freight trains, except for one Amtrak Coast Starlight passenger train that runs on the Valley Subdivision three days a week entering and leaving Chico in the middle of the night between 1:47 a.m. and 3:50 a.m.

Day-night average noise levels vary throughout the community depending on the number of trains operating along a given rail line per day, the timing and duration of train pass-by events, and whether the receptor is near an at-grade crossing. When railroad trains approach a passenger station or at-grade crossing, they are required to sound their locomotive horn for 15 to 20 seconds but not more than ¼ mile in advance. The required pattern is two long, one short, and one long sounding horn. The required volume level for train horns is between 96 and 110 dBA; the typical horn noise for UPRR freight trains is approximately 104 to 105 dBA at 100 feet.

Existing railroad noise levels were projected using the Federal Transit Administration (FTA) CREATE rail noise model and the Federal Rail Administration (FRA) Grade Crossing Horn Model, based on current freight and passenger train counts, day or night pass-bys, number of locomotives, number of rail cars, and speed. Based on FRA data and track speed limits, it was assumed that there are six day trains and six night trains on the Valley Subdivision traveling at an average speed of 50 mph. The train traffic consists entirely of freight trains with an average of three locomotives and 100 cars, except for the Amtrak Coast Starlight. This passenger train travels three days a week at an approximate speed of 70 mph with two locomotives and 12 cars, and passes through Chico in the middle of the night between 1:47 am and 3:50 am. On the Sacramento/Canyon Subdivision, the traffic consists entirely of freight trains (five day trains and five night trains) traveling at approximately 45 mph with an average of three locomotives and 100 cars. The calculated distances to the 65 dBA Ldn/CNEL contours from existing railroad noise are summarized in Table 16-8. Since a considerable amount of freight traffic has been diverted onto other lines, there are significantly fewer trains and rail noise on these lines than reported in the

2007 Setting and Trends Report. There are currently no Quiet Zones in Butte County.[4]

TABLE 16-8 EXISTING RAILROAD NOISE LEVEL SCREENING DISTANCES

Train	Subdivision	Distance (feet) to 65 dBA Ldn/CNEL Contour (Mainline)	Distance (feet) to 65 dBA Ldn/CNEL Contour (Within ¼ Mile of Grade Crossing)
UPRR	Valley Subdivision	275	449
UPRR	Sacramento and Canyon Subdivision – Feather River Route	275	407

3. Airport Noise

There are four existing public airports within Butte County: Chico Municipal Airport, Oroville Municipal Airport, Paradise Skypark Airport, and Ranchero Airport. The Chico Municipal and Oroville Municipal Airports are owned and operated by the cities of Chico and Oroville, respectively.

The noise impacts from these public airports were analyzed in the Butte County Airport Land *Use Compatibility Plan*, adopted by the Airport Land Use Commission (ALUC) on November 15, 2017. The data for airports in this analysis was obtained from the *Butte County Airport Comprehensive Land Use Plan*.

All land uses located outside of the 65 dB CNEL contours are considered compatible. However, residential and lodging land uses located between the 55 dB and 60 dB CNEL contours could generate complaints. This can be expected because the background noise levels, absent of aircraft overflights, are low. Maximum noise levels due to typical single engine aircraft over flights can range between 65 dB and 80 dB, which may be considered annoying to individuals.

[4] In a quiet zone, railroads have been directed to cease the routine sounding their horns when approaching public highway-rail grade crossings when certain additional safety measures have been met. Train horns may still be used in emergency situations or to comply with other federal regulations or railroad operating rules.

The purpose of the Butte County Airport Land Use Compatibility Plan is to establish procedures and criteria by which, in accordance with the California State Aeronautics Act, the ALUC shall review proposed land use development in Butte County and affected cities within the county. In addition, the ALUC shall review certain types of airport development proposals.

a. Chico Municipal Airport

The Chico Municipal Airport is the largest airport in Butte County. The airport runway is equipped with a precision instrument landing system and accommodates a full range of business aircraft. In 2014, commercial service was discontinued at Chico Municipal Airport, but in 2020 the City of Chico was awarded a Federal Aviation Administration (FAA) grant to assist with restarting commercial service. This was made possible by a 2018 amendment to the FAA reauthorization that removed a rule which kept the airport from getting commercial air grants. The airport also receives major use during the fire season, due to the fact that it is a designated "fire attack base."

Land use compatibility issues include urban expansion, which has gradually encroached upon the airport environs. The *Airport Land Use Compatibility Plan* has developed CNEL noise-level contours for the airport, which are shown in Figure 16-1.

b. Oroville Municipal Airport

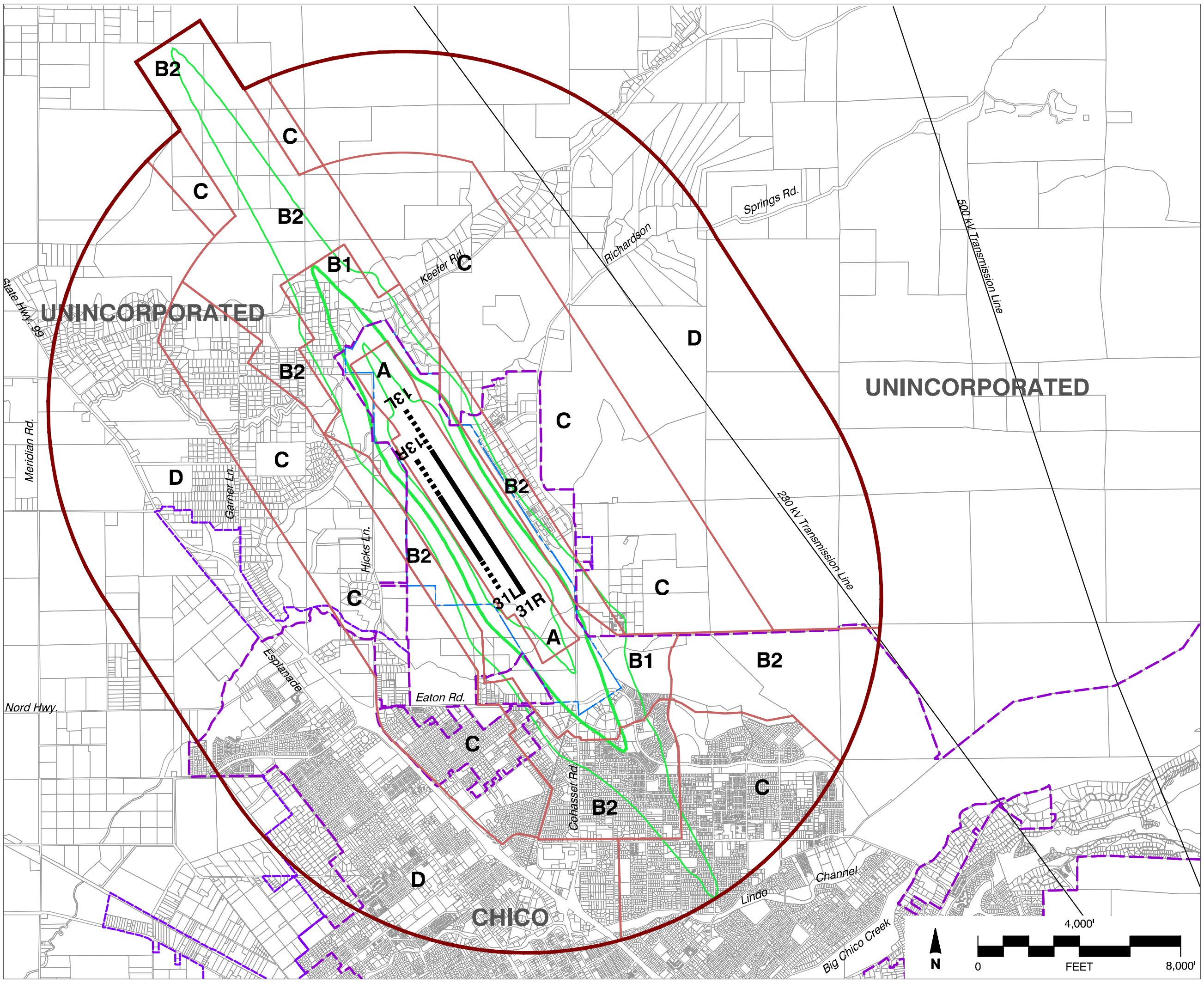
The Oroville Municipal Airport is located within an extension of the Oroville city limits and is approximately 2.5 miles west of the remainder of the city. Unincorporated land of Butte County, including the community of Thermalito, is located northeast of the airport. The *Airport Land Use Compatibility Plan* contains noise-level contours for the airport, which are shown in Figure 16-2.

c. Paradise Skypark Airport

The Paradise Skypark Airport is a privately owned airport.
The *Airport Land Use Compatibility Plan* contains noise level contours for the airport, which are shown in Figure 16-3.

d. Ranchaero Airport

This airport is a privately owned airport located near the southwestern edge of the City of Chico. This airport serves a combination of recreational, flight training, agricultural and limited business flights. The *Airport Land Use Compatibility Plan* contains noise level contours for the airport, which are shown on Figure 16-4.



Source: Butte County Airport Land Use Commission, Chico Municipal Airport Land Use Compatibility Plan, 2017.

Legend

Boundary Lines

- Existing Runway
  - Runway 13L-31R (6,724' X 150')
  - Runway 13R-31L (3,000' X 60')
- Future Runway Extension
  - Runway 13L-31R (8,600' Ult. Total Length)
  - Runway 13R-31L (6,000' Ult. Total Length)
- Airport Property Line
- City Limits
- City Sphere of Influence
- Compatibility Zones
- Airport Influence Area

Noise Impacts - Expanded Forecast [1]

- 55 dB CNEL
- 60 dB CNEL
- 65 dB CNEL

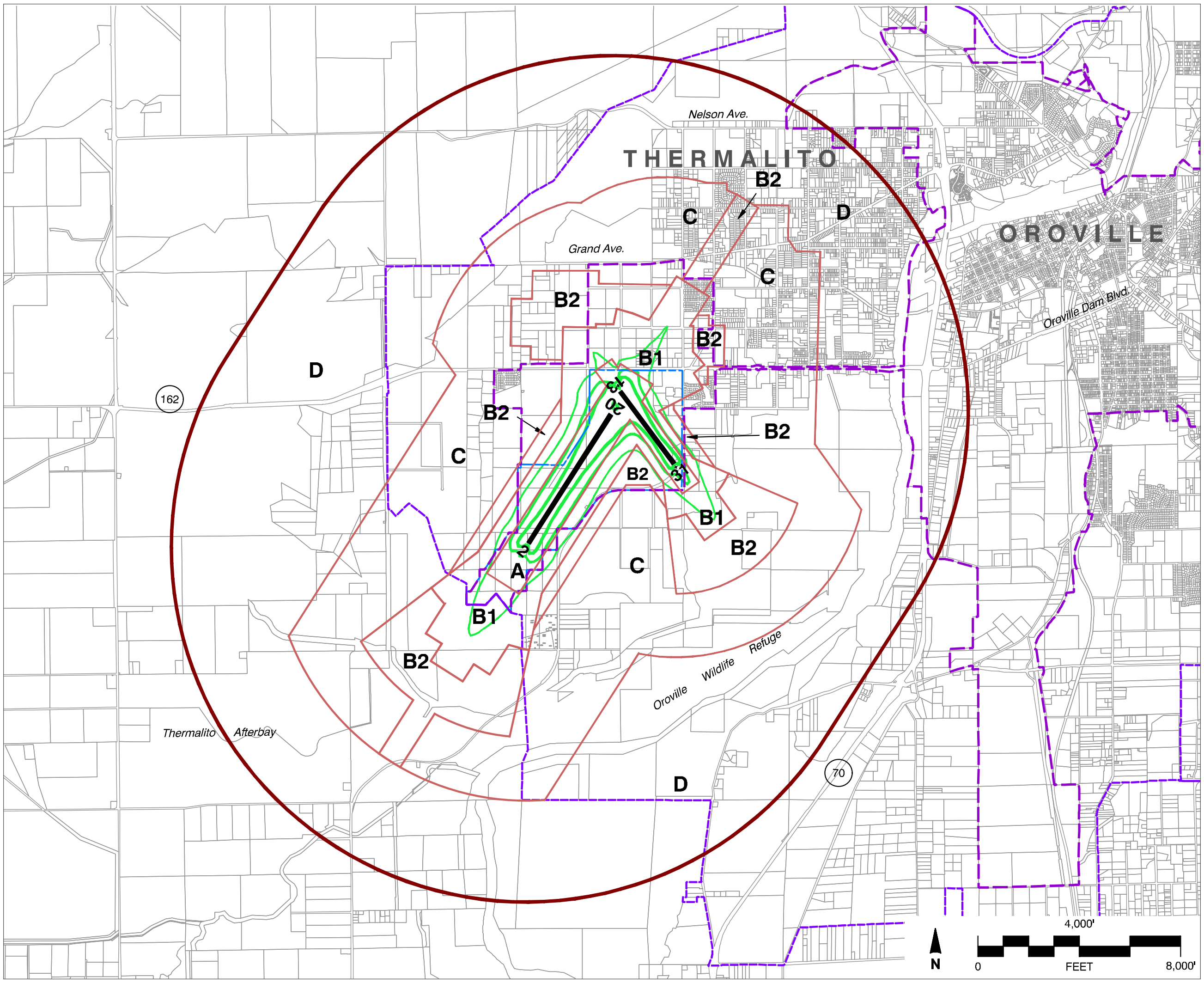
141,700 Future Annual Operations

Notes:

1. Noise Contour Source: Butte County Airport Land Use Compatibility Plan (2000); for compatibility planning purposes, forecast assumes 1.5 times the draft Chico Airport Master Plan 2018 forecast of 94,740 annual operations will be reached over a 20-year timeframe.

Figure 16-1

Chico Municipal Airport Noise Contours



Source: Butte County Airport Land Use Commission, Oroville Municipal Airport Land Use Compatibility Plan, 2017.

Legend

Boundary Lines

- Existing Runway
  - Runway 02-20 (6,020' X 100')
  - Runway 13-31 (3,540' X 100')
- Airport Property Line
- City Limits
- City Sphere of Influence
- Compatibility Zones
- Airport Influence Area

Noise Impacts[1]

- 55 dB CNEL
- 60 dB CNEL
- 65 dB CNEL

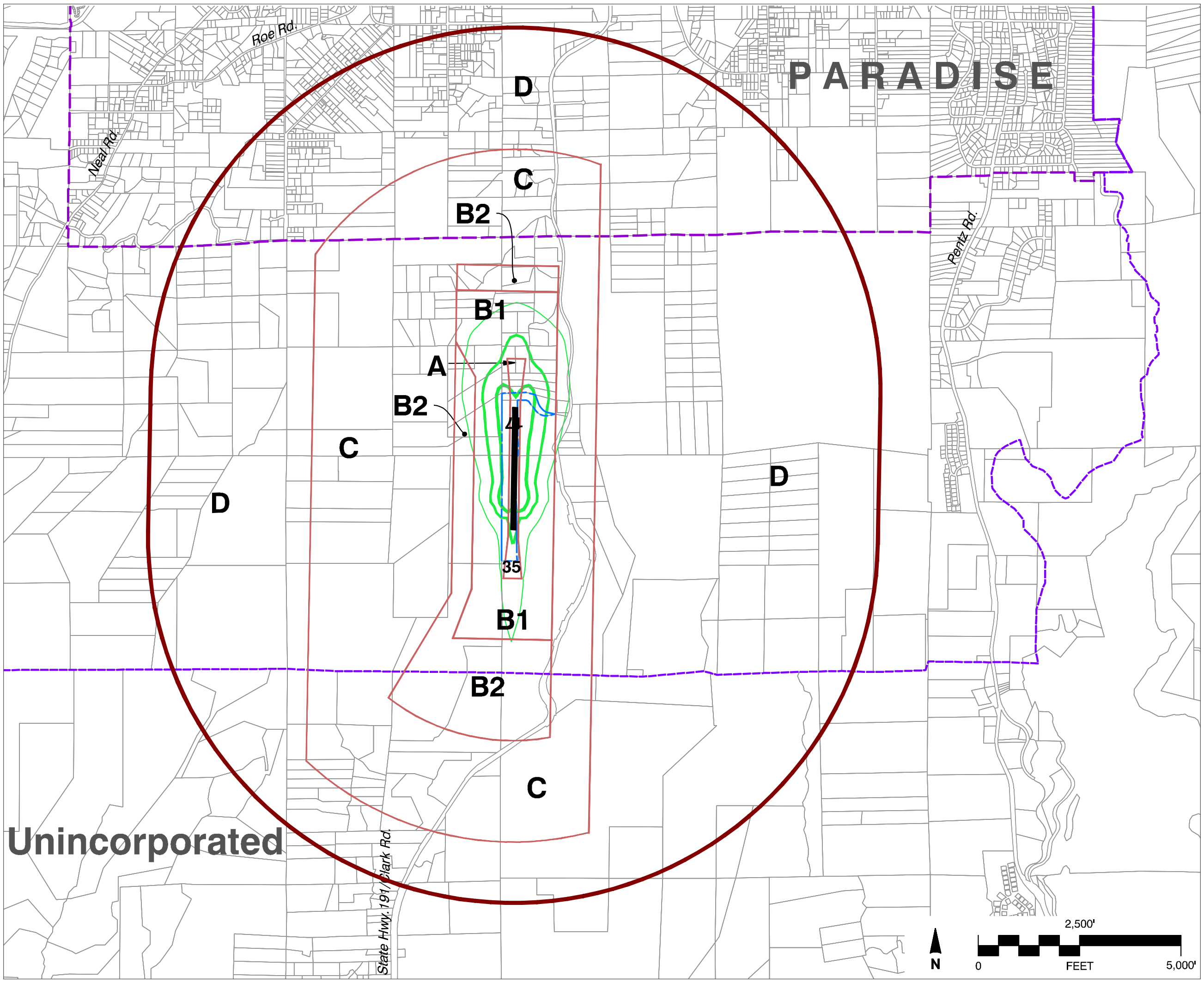
72,000 Future Annual Operations

Notes:

1. Noise Contour Source: Oroville Municipal Airport Master Plan (1990); for compatibility planning purposes, the 2010 Master Plan forecast is brought forward to cover the requisite 20-year timeframe.

Figure 16-2

Oroville Municipal Airport Noise Contours



Source: Butte County Airport Land Use Commission, Paradise Skypark Airport Land Use Compatibility Plan, 2017.

Legend

Boundary Lines

- Existing Runway 17-35 (3,017' x 60')
- Airport Property Line
- City Limits
- City Sphere of Influence
- Compatibility Zones
- Airport Influence Area

Noise Factors[1]

- 55 dB CNEL
- 60 dB CNEL
- 65 dB CNEL

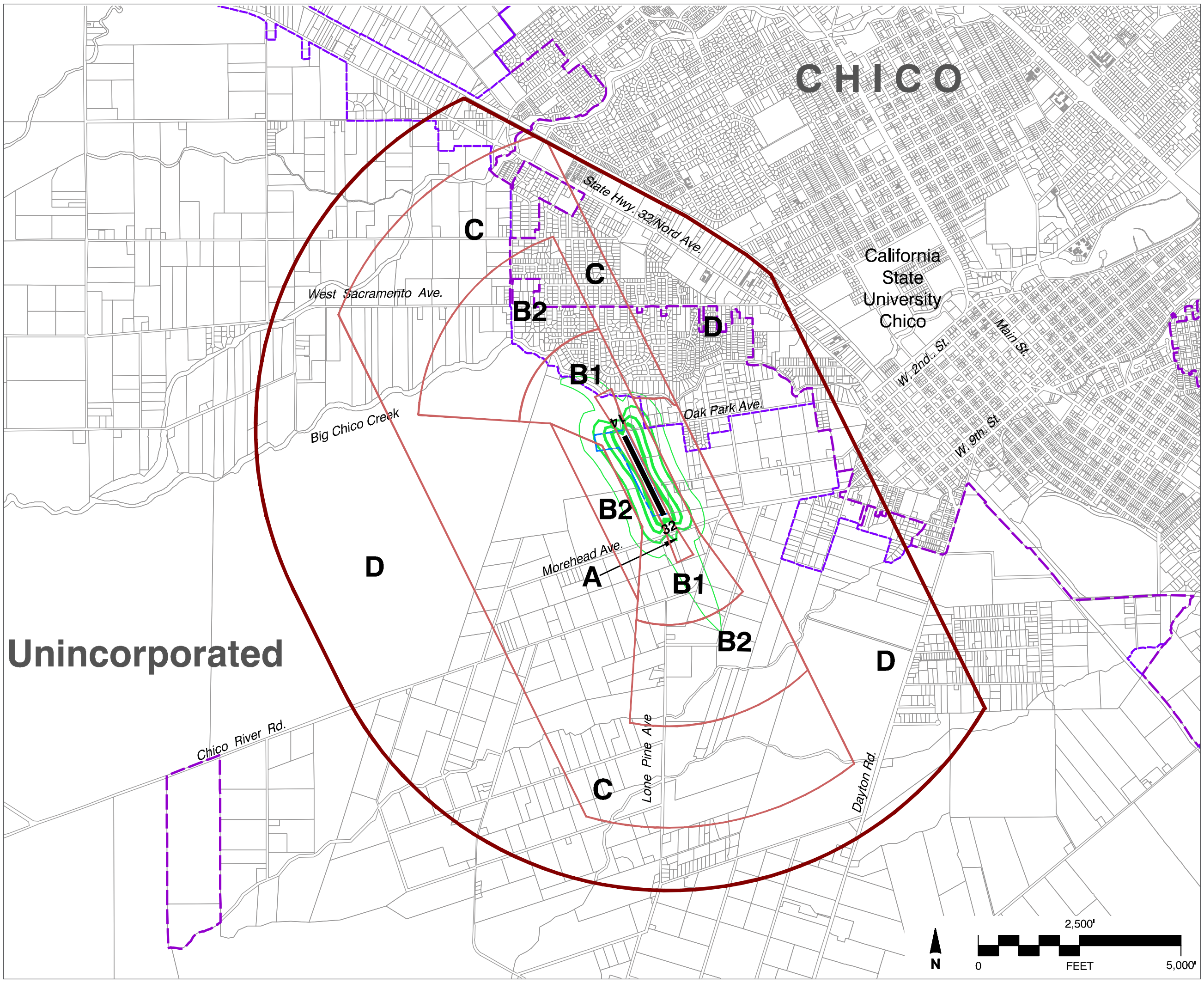
30,000 Future Annual Operations

Notes:

1. Noise Contour Source: Butte County Airport Land Use Compatibility Plan (2000); for compatibility planning purposes, the ALUCP forecast is brought forward to cover the requisite 20-year timeframe.

Figure 16-3

Paradise Skypark Airport Noise Contours



Source: Butte County Airport Land Use Commission, Ranchaero Airport Land Use Compatibility Plan, 2017.

Legend

Boundary Lines
- Existing Runway 14-32 (2,156' X 30')
- Airport Property Line
- City Limits
- City Sphere of Influence
- Compatibility Zones
- Airport Influence Area

Noise Impacts[1]
- 55 dB CNEL
- 60 dB CNEL
- 65 dB CNEL

10,000 Future Annual Operations

Notes:
1. Noise Contour Source: Butte County Airport Land Use Compatibility Plan (2000); for compatibility planning purposes, the ALUCP forecast is brought forward to cover the requisite 20-year timeframe.

Figure 16-4
Ranchaero Airport Noise Contours

E. Major Stationary Noise Sources

This section describes factors contributing to stationary noise, and the major sources of stationary noise in Butte County, including industrial, commercial, and public facilities.

1. Stationary Noise Sources

The production of noise is a result of many industrial processes, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by federal and state employee health and safety regulations (Occupational Safety and Health Administration [OSHA] and Cal-OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational, and public service facility activities can also produce noise that affects adjacent sensitive land uses. These noise sources can be continuous and may contain tonal components that may be annoying to individuals who live nearby. In addition, noise generation from fixed noise sources may vary based upon climatic conditions, time of day and existing ambient noise levels.

From a land use planning perspective, fixed-source noise control issues focus upon two goals:

- To prevent the introduction of new noise-producing uses in noise- sensitive areas.
- To prevent encroachment of noise sensitive uses upon existing noise-producing facilities.

The first goal can be achieved by applying noise level performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in near proximity to noise-producing facilities include mitigation measures to ensure compliance with noise performance standards.

Fixed noise sources that are typically of concern include the following:

HVAC Systems	Cooling Towers/Evaporative Condensers
Pump Stations	Lift Stations
Steam Valves	Steam Turbines
Generators	Fans
Air Compressors	Heavy Equipment
Conveyor Systems	Transformers

Pile Drivers	Grinders
Drill Rigs	Gas or Diesel Motors
Welders	Cutting Equipment
Outdoor Speakers	Blowers
Chippers	Cutting Equipment
Loading Docks	Amplified music and voice

The types of uses that may typically produce the noise sources described above include wood processing facilities, pump stations, industrial facilities, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, special events such as concerts, and athletic fields.

However, these descriptions do not provide a good correlation with the potential for annoyance from non-transportation or stationary noise sources, such as industrial and commercial operations, because many times such sources operate sporadically or for short durations. Examples of these types of noise sources include loading docks, special event concerts, pressure relief valves or alarms, which tend to be short duration noise events. When applying an L_{dn} or CNEL descriptors, the noise levels associated with these types of short-term operations will be averaged over a 24-hour period, underscoring the potential for annoyance.

2. Stationary Noise Sources

a. Neal Road Landfill

The Neal Road Landfill is located at 1023 Neal Road, south of the City of Chico and east of Highway 99.

The primary on-site noise sources associated with the Neal Road Landfill are the powered equipment and haul trucks, which include a belly scraper used for excavating dirt and spreading it over the refuse; a bulldozer which is used for ripping dirt for the scraper and moving refuse at the dump site; a compactor which is used for moving refuse, compacting the garbage and dirt which is deposited by the belly scraper; and the 10-wheel haul trucks which bring the refuse to the landfill. Based on data collected at landfills, a worst-case hourly average noise level is 80 dBA L_{eq}, at a reference distance of 50 feet, and maximum levels were as high as 94 dBA at a distance of 50 feet. Based on field observations, there are no noise-sensitive land uses affected by the landfill.

b. Transfer Stations

There are three solid waste transfer stations located in Butte County. One is located south of Chico on Scott Road (a recycling facility), another is located on Ord Ranch Road near Gridley, and a third operated by Recology is located at 2720 South Fifth Avenue in Oroville. Noise levels associated with transfer stations indicate that typical hourly average noise levels range between 60 dBA L_{eq} and 70 dBA L_{eq} at adistance of 50 feet from the transfer station building. The primary noise sources included forklifts, truck traffic, front-end loaders, balers and sounds of material dumping onto the floor. Measured noise levels where the buildings were enclosed were approximately 20 dBA to 25 dBA less than the sides of the buildings that were open to activities.

c. Cycleland Speedway

The Cycleland Speedway is in the central portion of Butte County on the southwest corner of Nelson Road and Highway 99. The speedway is located south of Chico and north of Gridley, adjacent to Highway 99. The Cycleland Speedway has both a 1/6-mile clay oval track and a 20-acre outdoor motocross track. Events at Cycleland Speedway run from mid-February to mid-October during the year. Most events are scheduled on the weekend, either on Saturday or Sunday.

The Cycleland Speedway was not in operation during a site visit; therefore, no noise measurements were conducted. Based on data collected at similar facilities, a worst-case hourly average noise level is 80 dBA L_{eq}, at a reference distance of 200 feet from the center of the motocross track and maximum levels were as high as 88 dBA at 200 feet.

d. Aggregate Mining Operations

Existing and proposed aggregate mining operations within Butte County have been identified as potential stationary noise sources. The locations of various mine sites are discussed in Chapter 11 of this Setting and Trends Report. The major noise sources associated with aggregate mining operations include the on-site activities, which include crushing and screening activities, operation of the generator, and off-site hauling of materials. The noise emissions of these various noise sources were obtained from file data for typical aggregate mining operations. Aggregate mining and processing noise emissions for small to moderate size facilities are approximately 85 dBA L_{eq} and 90 dBA L_{max}, respectively, at a reference distance of 100 feet. Therefore, unshielded operations would require setbacks of approximately 3,000 feet. Shielding of various on-site noise sources with natural berms or acoustical curtains can reduce overall noise levels between 5 dBA and 20 dBA.

A typical small to medium size aggregate mining operation can be expected to harvest approximately 100,000 tons to 300,000 tons of material from the site on an annual basis. Based on a capacity of 25 tons per truck, and approximately 133 truck trips per day (67 loads times one arrival and one departure), it can be expected that truck traffic on roadways would result in a peak-hour noise level of 63 dBA to 65 dBA L_{eq} at a distance of 100 feet from the roadway centerline and an L_{dn} of approximately 63 dB at a distance of 100 feet. However, roadway grade, travel speed, truck type and roadway pavement can have an effect on the overall noise emissions.

In addition to the aforementioned mining and processing noise sources, it may be necessary to conduct blasting to free the aggregate resources for excavation with a front loader. Noise sources associated with blasting consist of rock drills and the shot itself. The noise levels generated by the rock drills are dependent on drill type, but are similar to the noise levels generated by excavation equipment.

Noise generated by aggregate shots are more variable, depending on the amount of charge-material used, the number of holes and the depth of those holes, timing delays and other factors. There tend to be misconceptions regarding what an aggregate blast looks and sounds like, due in part to the types of explosions that are frequently seen in movies. In reality, aggregate shots are designed to transfer the energy of the shot into the ground, rather than have it vent into the atmosphere.

Based on observations of various aggregate shots, it has been determined that aggregate shots are more characteristic of muted thunderclaps, rather than fiery explosions. From noise and vibration monitoring conducted for those blasts, blasting levels are predicted to be in the range of 60–70 dBA L_{max} at distances of approximately ½-mile.

e. General Service Commercial and Light Industrial Uses

Noise sources associated with service commercial uses such as automotive repair facilities, wrecking yards, tire installation centers, car washes, loading docks, etc., are found at various locations within Butte County. The noise emissions of these types of uses are dependent on many factors and are therefore difficult to quantify precisely. Nonetheless, noise generated by the these uses contributes to the ambient noise environment in the immediate vicinity of these uses and should be considered where either new noise- sensitive uses are proposed nearby or where similar uses are proposed in existing residential areas.

f. Parks and School Playing Fields

There are numerous park and school uses within the unincorporated areas of Butte County. Noise generated by these uses depends on the age and number of people utilizing the respective facility at a given time and the types of activities they are engaged in. School playing field activities tend to generate more noise than those of neighborhood parks, as the intensity of school playground usage tends to be higher. At a distance of 100 feet from an elementary school playground being used by 100 students, average and maximum noise levels of 60 and 75 dBA, respectively, can be expected. At organized events such as high-school football games with large crowds and public address systems, the noise generation is often significantly higher. As with service commercial uses, the noise generation of parks and school playing fields is variable.

g. Wild Goose Gas Storage

The Wild Goose Gas Storage facility is located on West Liberty Road, west of the City of Gridley. The facility purchases and withdraws natural gas from a main gas line, stores the natural gas underground and then sells the gas, as the market changes. Major noise sources associated with the facility include compressors and large diesel engines located inside the main building and pressure relief valves located outside on the property. Bollard & Brennan, Inc., conducted noise level measurements in 2000 at the nearest residential uses to the east and west of the project site. Noise measurement results indicated that daytime and nighttime noise levels due to the facility were not audible and that overall background noise levels were generally below 50 dBA L_{eq}.

h. Diamler Rock Mine Project

Bollard & Brennan, Inc., conducted an Environmental Noise Analysis for the site in December 2000.[5] The project includes mining and processing activities on a 42-acre portion of an overall 536-acre site. The project site is located within the Lucky 7 Ranch, west of and adjacent to Wheelock Road. The surrounding land is designated as Grazing and Open Land by the existing General Plan, with the exception of a residential subdivision (Rolling Hills Estates) to the north. The nearest residence is approximately 1,000 feet from the proposed mining site. A series of noise mitigation measures were included in the project design to reduce the potential for annoyance at residential uses.

[5] Bollard & Brennan, Inc., 2000. *Environmental Noise Analysis, Diamler Rock Mine Project, Butte County California*. December 3.

i. Paradise Rod & Gun Club Shooting Range

The Paradise Rod & Gun Club is located along the Skyway about 6 miles east of Highway 99. Bollard & Brennan, Inc., conducted an environmental noise analysis for the site in July 1998.[6] The facility provides recreational rifle and pistol shooting for the general public and club members, local law enforcement for training, and youth firearms safety. A series of noise mitigation measures were included in the project design to reduce the potential for annoyance at residential uses.

[6] Bollard Acoustical Consulting, 1998. *Environmental Noise Analysis, Paradise Rod & Gun Club Shooting Range, Butte County California*. July 31

17 HAZARDS AND SAFETY

One of Butte County's most important roles is to prepare for and respond to various hazards that threaten human life, property, and environmental integrity. Hazards are natural or human-caused events or physical conditions that have the potential to cause fatalities, injuries, property and infrastructure damage, agricultural losses, damage to the environment, interruption of businesses, or other types of harm or loss. They range from everyday occupational hazards, including simply driving to work, to infrequent natural or climate change-related disasters such as large floods or wildfires.

This chapter addresses hazards that pose the greatest risks to the people and economy of Butte County to ensure the County and other agencies can mitigate, prepare for, respond to, and recover from these hazards. These include wildland and urban fires, floods, and seismic and geologic hazards, especially landslides, debris flows, and other slope failures. Climate change will likely cause many of the natural hazards to become more frequent or severe, and therefore other climate change-related hazards, such as drought and extreme heat, are described in this chapter. Other sections include hazardous materials, structural hazards and damage to critical facilities, dam safety, and emergency response.

I. EMERGENCY PLANNING

Planning for emergencies requires a thorough assessment of existing and potential hazards and detailed contingency plans so that relevant agencies are prepared to respond in a timely and comprehensive manner. This section summarizes the regulatory framework that pertains to emergency planning in Butte County, the existing County Emergency Plan and Local Hazard Mitigation Plan, inter-agency coordination policies, and critical facilities.

A. Regulatory Setting

This section briefly summarizes existing State and County regulations that shape emergency planning and response services in Butte County.

1. State Regulations

Section 65302(g) of the California Government Code requires county General Plans to include a Safety Element that must include an analysis of seismic, geologic, flooding, and wildland and urban fire hazards, including mapping of these hazards. The Safety Element must also address evacuation routes, military installations, peak load water supply, and minimum road widths and clearances. In 2015, Senate Bill

379 amended Section 65302(g) of the California Government Code to require Safety Elements be updated upon the next revision of a hazard mitigation plan (HMP) to address climate adaptation and resiliency in cities and counties. Section 65302.6 stipulates that counties may adopt a local HMP, which must meet the standards set forth in the federal Disaster Mitigation Act of 2000. This Act requires that HMPs include the following:

- an initial earthquake performance evaluation of public facilities that provide essential services, shelter, and critical governmental functions;
- an inventory of private facilities that are potentially hazardous, including, but not limited to, multiunit, soft-story, concrete tilt-up, and concrete frame buildings; and
- a plan to reduce the potential risk to private and governmental facilities in the event of a disaster.

Other sections of the California Government Code applicable to emergency planning include Section 65302(g)(5), which requires the Safety Element, upon the next revision of the Housing Element or HMP, to identify residential developments in any hazard area that do not have at least two emergency evacuation routes (Senate Bill 99), and Section 65302.15, which requires the Safety Element, upon the next revision of the HMP or no less than every eight years, to identify evacuation routes and their capacity, safety, and viability under a range of emergency scenarios (Assembly Bill 747).

2. County Regulations

A number of Butte County regulations have bearing on the identification and prevention of hazards within its area of jurisdiction.

a. Butte County Code

Chapter 8, Emergency Services, of the Butte County Code provides for the preparation and execution of plans for the protection of persons, the environment, and property within the County of Butte in the event of an emergency, the direction of the emergency services organization and the coordination of the emergency functions of the County of Butte with the Cities of Chico, Oroville, Gridley, Biggs and the Town of Paradise and all other affected public agencies, corporations, organizations and private persons within the County of Butte.

Chapter 20, Article VI, Subdivision Design Standards, lists improvement standards, such as minimum road widths, fire protection, and utility requirements, for subdivisions, parcel maps, and site improvements.

Chapter 24-28, Purpose of Special Purpose Zones, contains the Airport (AIR) Air Zone, which preserves and protects Butte County's airports by only allowing land uses and activities that are associated with airport operations, and preventing the encroachment of incompatible uses.

Chapter 45, Emergency Medical Response, provides regulations of all emergency medical services to protect the health, safety, and welfare of residents in the county and ensure competent and adequate care is provided for those in need of emergency medical services.

Chapter 53, Camp Fire Recovery, allows residents to live on properties in the Camp Fire area that do not contain fire ash and debris from a qualifying structure destroyed or damaged by the Camp Fire. This chapter is intended to allow for the fastest possible transition of residents made homeless or displaced by the Camp Fire to interim and long-term shelter. This chapter relaxes certain standards in the Zoning Ordinance to allow for additional temporary housing opportunities outside of the boundaries of the Camp Fire to meet the urgent need for housing of displaced people.

Chapter 54, North Complex Fire Recovery, temporarily modifies various Zoning Ordinance regulations and policies to allow the fastest possible transition of residents made homeless or displaced by the North Complex Fire to interim and long-term shelter. This chapter relaxes certain standards in the Zoning Ordinance to allow for additional temporary housing opportunities outside of the boundaries of the North Complex Fire to meet the urgent need for housing of displaced people.

b. County General Plan

Butte County's General Plan includes a detailed Health and Safety Element, most recently adopted in 2010, which primarily focuses on noise, flood hazards and dam inundation, seismic and geologic hazards, fire hazards, hazardous materials, emergency response and disaster preparedness, and community health. Specific seismic and geologic topics such as landslide and liquefaction potential, erosion, expansive soils, and volcanics are addressed in the seismic and geologic hazards section. The fire hazards section addresses fire risk, fire protection, and evacuation and access throughout the county.

c. Local Hazard Mitigation Plan

In October 2019, the County adopted an updated Local Hazard Mitigation Plan (LHMP), which was multi-jurisdictional in nature and included the following cities, towns, and agencies:

- City of Biggs
- City of Chico
- City of Gridley
- City of Oroville
- Town of Paradise
- Paradise Irrigation District
- Thermalito Water and Sewer District
- Durham Irrigation District
- North Yuba Water District
- Feather River Recreation and Park District
- Butte County Fire Safe Council
- Lake Oroville Area Public Utility District
- Paradise Recreation and Park District
- South Feather River Water and Power Agency
- Butte County Office of Education (representing Butte County School Districts)

The Butte County Office of Emergency Management is responsible for the development and updating of the LHMP to meet federal requirements (Code of Federal Regulations, Stafford Act Title 44, Chapter 1, Part 201) to be eligible for certain federal disaster assistance, such as the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and the Flood Mitigation Assistance Program. The LHMP represents a cooperative effort between the County, incorporated municipalities, and special districts to document and plan for mitigation of natural and human-caused hazards. The overall intent of the LHMP is to identify hazards that threaten communities, determine likely impacts, set mitigation goals, and determine appropriate mitigation strategies to be prioritized and implemented. It identifies past and present mitigation activities and mitigation strategies for the future for each jurisdiction or agency involved in the LHMP update, as listed above.

d. Butte County Operational Area Emergency Operations Plan (EOP)

The EOP, updated in February 2011, is currently in full force and effect, and serves as the official emergency organization plan for Butte County. It includes planned operational functions and the overall responsibilities of each area of the County with level of service in addressing emergency situations. While emergency services are administered at the State and County level, they are available to local jurisdictions as well. The Plan contains the following purpose statement:

> "The purpose of the Butte County Emergency Operations Plan (BCEOP) and its Functional Annexes and Hazard/Threat Specific Appendices is to provide the basis for a coordinated response before, during and after a disaster incident affecting the Butte County Operational Area. This plan is the principal guide for the County's response to, and management of real or potential emergencies and disasters occurring within its designated geographic boundaries.[1]"

The Plan is designed to focus on potential large-scale disasters, rather than daily emergencies that are regularly handled by local law enforcement and protection agencies. The Plan defines the County's planned response to emergency situations associated with natural disasters, hazardous materials incidents, and terrorism defense operations. The Plan is activated by the following alarms or incidents:

- An order of the Butte County Director of Emergency Management
- A state of emergency proclaimed by the Governor
- A proclaimed state-of-war emergency
- A Presidential declaration of a National Emergency
- Upon receipt of an attack warning
- An occurrence of a catastrophic disaster that requires immediate government response.

[1] Butte County Operational Area *Emergency Operations Plan*, page 14.

The Plan contains a threat summary for Butte County and includes an analysis of natural, technological, and human-caused disasters.

B. Inter-agency Coordination and Response

Butte County maintains an Office of Emergency Management (OEM) to coordinate overall response through the Emergency Operations Center (EOC). When activated, the EOC provides a central location for responding and supporting agencies to collaborate response and recovery efforts in order to provide information and deploy resources effectively and efficiently. Outside of disaster events, the Butte County OEM supports and coordinates disaster planning, community preparedness, mitigation, and training.[2] OEM works with federal, State, and local agencies to develop effective emergency response systems within the county.

The County provides the majority of funding for emergency services through the General Fund. When a catastrophic event occurs and the County and State declare a disaster, funding for response, recovery, and future hazard mitigation efforts can become available through FEMA.

The Butte County EOP states that mutual aid resources will be provided in accordance with the California Master Mutual Aid Agreement. The Plan calls for establishing agreements among various jurisdictions in order to prepare a coordinated response to a proclaimed emergency. The agreements are activated when a state of emergency is declared, and the assistance occurs as prearranged among participating agencies.

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[2] Butte County Office of Emergency Management. 2020. "Office of Emergency Management". http://www.buttecounty.net/oem/ accessed February 11, 2021.

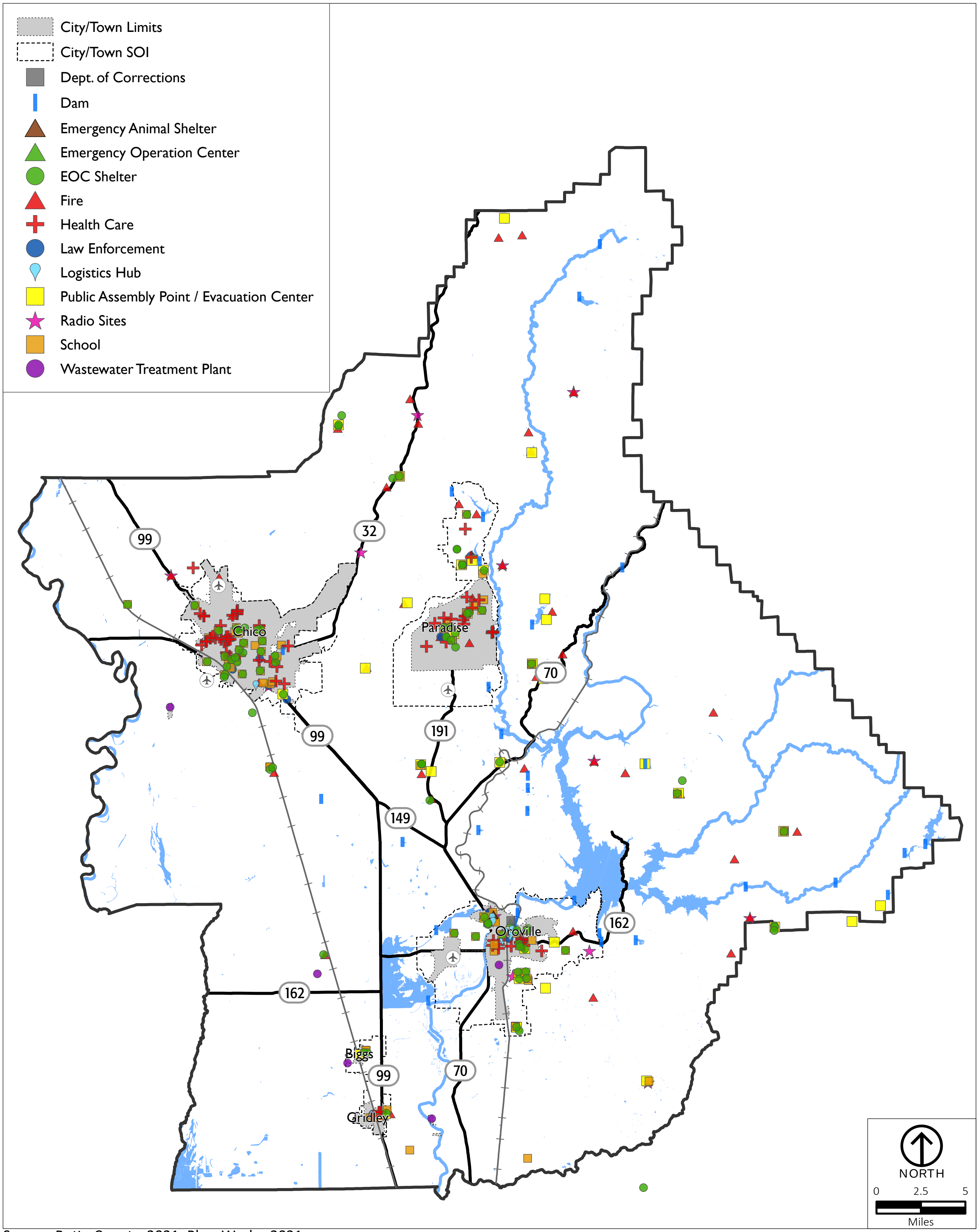
C. Critical Facilities

Critical facilities can be categorized as follows:[3]

- Essential Services Facilities: Facilities that provide public safety, emergency response, emergency medical care, designated emergency shelters, communications, and government operations services. This also includes facilities that provide key utility services, such as electricity, natural gas, and water and wastewater service.
- At Risk Population Facilities: Facilities that provide care and assistance for children, senior citizens, and persons with disabilities, such as pre-schools, public and private primary and secondary schools, before and after school care centers with 12 or more students, daycare centers with 12 or more children, group homes, and assisted living residential or congregate care facilities with 12 or more residents.
- Hazardous Materials Facilities: Facilities that could, if adversely impacted, release hazardous material(s) in sufficient amounts during a hazard event that would create harm to people, the environment, and property.

According to the Butte County LHMP, approximately 112 essential service facilities, such as the Chico wastewater treatment plant, the Emergency Operations Center, and emergency animal shelter, as well as 30 schools (at risk population sites) are located in the unincorporated areas of the county, as shown in Figure 17-1. A number of these facilities are described in further detail in other chapters of this report including police and fire stations (see the Public Services chapter) and public utilities (see the Wastewater, Stormwater, and Solid Waste Chapter and Energy chapter).

[3] Butte County Office of Emergency Management. 2019. Local Hazard Mitigation Plan 2019, Chapter 4: Risk Assessment. http://www.buttecounty.net/Portals/19/LHMP/2019/CH4ButteCountyLHMPUpdateChapter4RiskAssessment.pdf?ver=2019-11-13-122000-400.



Source: Butte County, 2021; PlaceWorks, 2021.

FIGURE 17-1

COMMUNITY FACILITIES AND CRITICAL FACILITIES

D. Evacuation Planning

Butte County developed evacuation plans and maps for each sub-region of the county, including Berry Creek, Butte Creek/Butte Valley, Cohasset/Richardson Springs, East Oroville/Bangor/Palermo/Cherokee, Forbestown/Clipper Mills/Feather Falls/Robison Mill/Hurleton, Forest Ranch/Butte Meadows, Paradise/Upper Ridge, and Yankee Hill. Each plan includes a map of key evacuation routes, advisory language, and preparation tips for community members. There are also eleven flood evacuation zones in southern and western portions of the County, with guidance for evacuation routes, public assembly points, and evacuation centers. These evacuation plans help educate and prepare residents for emergencies and enables OEM to effectively respond to a disaster event.

II. FIRE HAZARDS

The public is exposed to fire-related hazards from two potential sources: structural fires and wildfires, affecting urban and wildland and wildland-urban interface areas. The wildland-urban interface (WUI) is considered any developed area where conditions affecting combustibility of natural and cultivated vegetation, and structures or infrastructure, allow for the ignition and spread of fire through these combined fuels.[4] This section describes general conditions under which both types of fires may occur, including factors that may contribute to increased fire hazards within Butte County and its communities.

This section first describes the regulatory framework which shapes the mitigation and prevention of both structural fires and wildfire hazards. Following this discussion is a description of conditions in Butte County which contribute to the threat of structural fires and wildfires. While most areas of the county are susceptible to structural fires, the section below will discuss areas most susceptible to wildfires and factors that worsen wildfire conditions. The section concludes with a description of the County's response to fires and wildfire mitigation programs and projects.

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[4] Governor's Office of Planning and Research. 2020. Fire Hazard Planning Technical Advisory. https://opr.ca.gov/docs/20201109-Draft_Wildfire_TA.pdf.

A. Regulatory Setting

This section briefly summarizes existing federal, State, and County regulations that shape fire hazard planning and response services in Butte County.

1. Federal Regulations

In August 2020, a new joint State-federal initiative launched to reduce wildfire fuels, restore watersheds, and protect habitats to meet climate objectives. Under the Agreement for Shared Stewardship of California's Forest and Rangelands, the federal government will match California's goal of reducing wildfire risks on 500,000 acres of forest land per year. The federal government (U.S. Forest Service, National Park Service, Bureau of Land Management, and other agencies) owns approximately 58 percent of California's 33 million acres of forested land, including Plumas and Lassen National Forests in eastern Butte County. With this agreement, 1 million acres of forest and wildland areas will be treated per year to reduce wildfire risks, which will enable resilient, fire-adapted communities.

2. State Regulations

A number of State regulations have bearing on the mitigation and prevention of fire hazards in Butte County. These are summarized below.[5]

a. 2018 California Strategic Fire Plan

The 2018 California Strategic Fire Plan is the State's roadmap for reducing wildfire risks throughout the state. This plan lays out CAL FIRE's efforts to reduce firefighting costs and property losses, increase firefighter safety, and improve overall ecosystem health. Objectives to reach these goals include reviewing general plan safety elements to play a more active role in local planning, integrating implementation of fire and vegetative fuel management projects consistently with the priorities of land managers, and conducting needed assessments and actions for post-fire protection and recovery.

b. California Government Code

Section 65302 of the California Government Code requires county general plans to include a safety element which must include an assessment of wildland and urban fire hazards. In 2012, Senate Bill 1241 updated Section 65302 of the California Government Code to require counties with areas within the state responsibility area

[5] Governor's Office of Planning and Research. 2020. Fire Hazard Planning Technical Advisory. https://opr.ca.gov/docs/20201109-Draft_Wildfire_TA.pdf.

(SRA) or very high fire hazard severity zones (VHFHSZs) to address and incorporate information, policies, and programs regarding wildfire hazards and risks. Section 65302(g)(3) requires safety elements to identify fire hazard severity zones, historical data on wildfires, location of land uses within VHFHSZs, and agencies responsible for fire protection. A set of feasible goals, policies, and actions is also required to minimize wildfire hazards and facilities within wildfire hazard areas. Section 65302.5(b) of the California Government Code was also amended to require draft safety elements to be submitted to the State Board of Forestry and Fire Protection and every local agency that provides fire protection in the county for a 90-day review.

In 2015, Senate Bill 379 established Section 65302(g)(4) of the California Government Code to require that climate change adaptation and resilience be addressed in safety elements upon the next revision of a LHMP, including a vulnerability assessment that addresses how climate change will affect existing natural hazards, such as wildfire.

In 2018, Senate Bill 1035 added Section 65302(g)(6) of the California Government Code, which requires counties to update the climate adaptation portion of their safety elements at least every eight years to address updated information, including fire hazards information that was previously not available.

In 2019, Senate Bill 99 and Assembly Bill 747 updated Section 65302 to require safety elements to address evacuation-constrained communities and the capacity, safety, and viability of evacuation routes under different hazard conditions, including wildfire.

c. Public Resources Code

Section 4290 of the Public Resources Code (PRC) covers Fire Safe Regulations, the purpose of which is to establish minimum standards for signs identifying streets, roads, buildings, and private water supply reserves for emergency fire use, as well as fuel modification standards for fuel breaks and road and driveway standards for emergency fire equipment access and public evacuations. Section 4290 applies to land within an SRA or VHFHSZ as defined by Section 4102 of the PRC.

Section 4291 of the PRC requires defensible space standards for all property within the SRA and all property within a VHFHSZ within a local responsibility area (LRA). Requirements include 100 feet of vegetation clearance around homes, removal of dead or dying vegetation, vegetation removal around chimneys and stovepipes, and updating public access to code requirements.

d. California Fire Code

The 2019 California Fire Code (Title 24, Part 9 of the California Code of Regulations) went into effect in January 2020. The 2019 California Fire Code incorporates the 2018 International Fire Code and establishes standards for buildings and other structures to reduce the risk of fire damage. The County regularly adopts the most recent version of the California Fire Code into Chapter 26-1 of the Butte County Code of Ordinances.

e. California Building Code

The California Building Code (CBC), Part 2 of Title 24 of the California Code of Regulations, identifies design and construction standards for new and significantly renovated buildings, including those for fire safety. Typical fire safety requirements of the CBC include the installation of sprinklers in all high-rise buildings and other facilities; the establishment of fire-resistance standards for fire doors, building materials, and particular types of construction in high fire hazard severity zones; requirements for smoke-detection systems; exiting requirements; and the clearance of debris. Chapter 7A of the CBC, Materials and Methods for Exterior Wildfire Exposure, prescribes building materials and construction methods for new buildings in a fire hazard severity zone. Chapter 7A contains requirements for roofing; attic ventilation; exterior walls; exterior windows and glazing; exterior doors; decking; protection of underfloor, appendages, and floor projections; and ancillary structures. The County regularly adopts the most recent version of the CBC into Chapter 26-1 of the Butte County Code of Ordinances.

3. County Regulations

a. Butte County Code

Chapter 8 of the Butte County Code provides for the preparation and implementation of plans for the protection of persons, the environment, and property within the County of Butte in the event of an emergency, and the direction of the emergency services organization. It also establishes the coordination of the emergency functions of the County of Butte with the Cities of Chico, Oroville, Gridley, Biggs and the Town of Paradise and all other affected public agencies, corporations, organizations, and private persons within the county.

Chapter 38A, titled “Fire Prevention and Protection,” supplements fire prevention and protection statutes, regulations, and ordinances enacted by the State, the county, or any other governmental agency having jurisdiction, including but not limited to Public Resources Code sections 4290 and 4291 (described above). It includes information on noticing and hearings for fire hazards, fire hazard abatement and enforcement, and criminal violations and penalties associated with fire hazards.

b. Butte County Community Wildfire Protection Plan
In 2010, Butte County adopted the Butte County Community Wildfire Protection Plan (CWPP), which was most recently updated in 2015. The CWPP addresses pre-fire strategies to be implemented through a partnership with fire agencies in Butte County, the Butte County Fire Safe Council, local community groups, and landowners. Hazard reduction measures include fuels reduction, prescribed burning, defensible space inspections, fire-resistant building construction standards enforcement, land use planning, and fire safety education.

The Butte County LHMP also provides hazard mitigation actions to reduce wildfire risks in the county, as stated above.

B. Structural Fires and Wildfires

This section explains the differences between structural fires and wildfires as well as the unique mitigation and response techniques that apply to each.

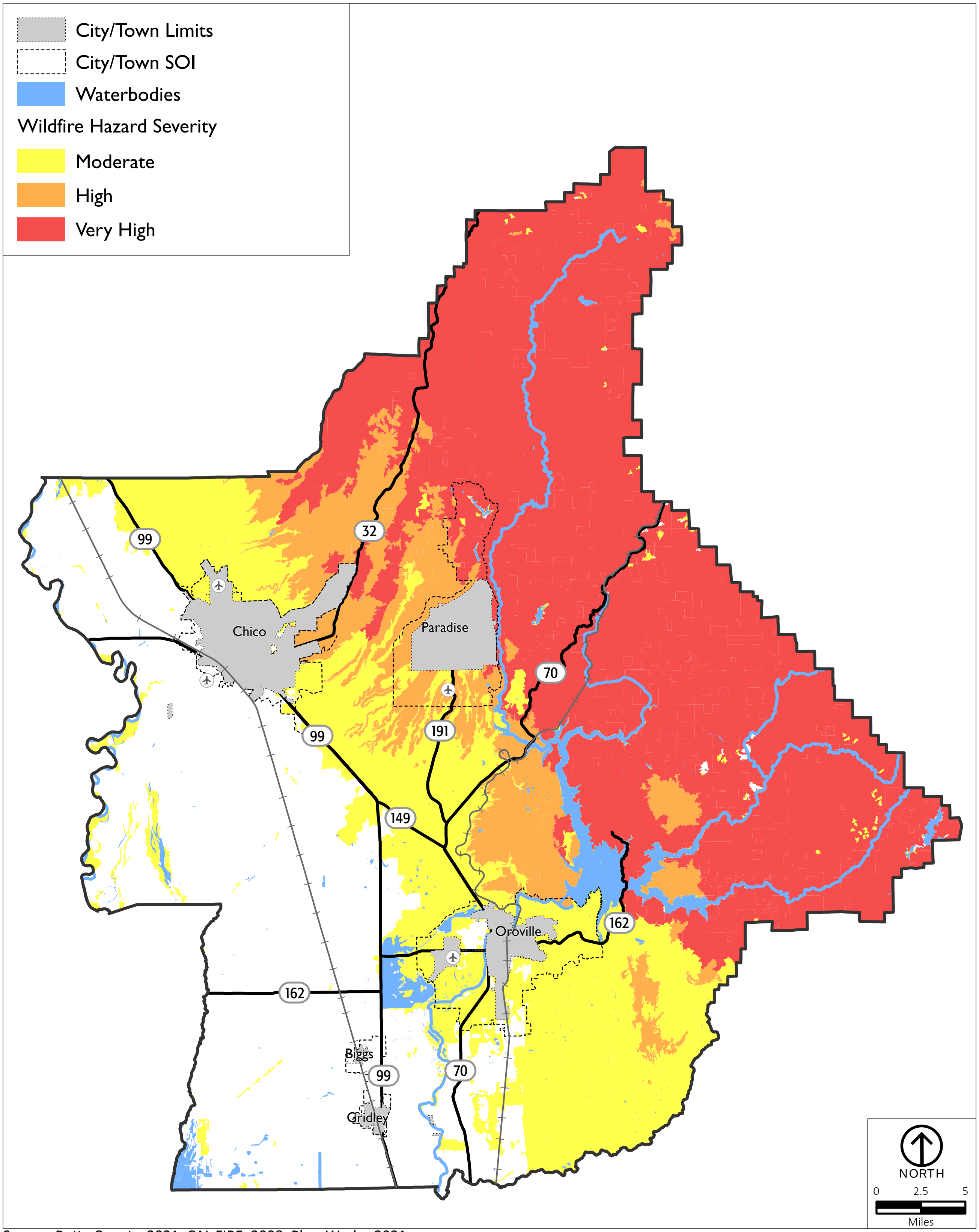
1. Wildfires

The term "wildfire" refers to fires that usually result from the ignition of dry grass, brush, or timber. Historically, wildfires commonly occurred in areas that are characterized by steep or heavily vegetated areas, which make suppression of the fire difficult. More recently, wildfires have been encroaching into more urban areas within the WUI, threatening homes, businesses, and essential infrastructure. While wildfires play an important role in the ecology of many natural habitats, as urban development moves into areas susceptible to wildfire hazards, risks to human safety and property increase.

WUI conditions often occur when urban development is intermixed with wildland vegetation, or when pockets of wildland vegetation occur inside developed areas. The foothill communities of Kelly Ridge, Bangor, Cohasset, Forest Ranch, Concow, Yankee Hill, Berry Creek, Forbestown, communities on the Upper Ridge, and the town of Paradise are examples of WUI areas. Fires that occur within WUI areas are more likely to impact structures and the people depending on the structures, such as homes, schools, and commercial buildings. Many of the WUI areas in Butte County also have few access roads, making it difficult to evacuate and for emergency responders to fight the fire and help residents in these areas.

Wildfire hazard risks are based on a number of combining factors including fuel loading (vegetation), topography, and weather conditions such as winds, humidity and temperature, as well as the proximity of structures and urban development to fire hazards. Historically, late summer and early fall are the periods of greatest risk for wildfires, when vegetation is at its driest. Climate change is likely to extend the wildfire season, as temperatures are projected to stay warm later into fall and increase earlier in the spring. Droughts may also occur more often, drying out vegetation, increasing the likelihood of a wildfire sparking. Human activity, including residential and agricultural burning, mowing of dead grass, electrical equipment malfunction, careless disposal of cigarettes, campfires, and use of fireworks can all trigger fires, in addition to natural causes such as lightning strikes.

Figure 17-2 shows fire hazard severity zones in Butte County, using data from the California Department of Forestry and Fire Protection (CAL FIRE), based on factors such as fuel load, topography, and weather conditions. According to Table 4-47 of the LHMP, approximately 42 percent of the unincorporated county is located within a VHFHSZ, 14 percent is located within a high fire hazard severity zone, and 13 percent is located in a moderate fire hazard severity zone. In total, 69 percent of unincorporated Butte County lies within a fire hazard severity zone, which does not account for all areas within the WUI.



Source: Butte County, 2021; CAL FIRE, 2008; PlaceWorks, 2021

FIGURE 17-2

WILDFIRE HAZARDS

The foothills and mountainous areas of the county, extending from Cohasset in the north to Forbestown in the south, have been designated as either High or Very High fire hazard severity zones with the majority of the area in the Very High classification. These portions of Butte County contain homes within areas of denser vegetation, providing fuel for fires, and steep slopes create challenges for fire suppression efforts. To the extent that firefighting equipment can access these areas, it is often on rural, mountain roads that have limited capacity, and some areas may not contain pressurized fire systems with fire hydrants to help put out wildfires.

a. Factors Influencing Wildfires

Several factors influence wildfire conditions and facilitate the spread of wildfires, including topography, fuels, weather conditions, and climate change. Human actions are also the leading cause of wildfires in California, increasing the risk of wildfire devastating natural lands and communities. This section describes these five factors.

i. Weather

The climate in Butte County is generally referred to as "Mediterranean" with hot, dry summers and cool, wet winters. Cooler summers and cold winters with snowfall are common in areas of higher elevation. Rainfall throughout the county occurs mainly between October and April, and ranges between 80 inches per year in the foothill/mountain areas in eastern Butte County, to less than 18 inches per year in areas along the Sacramento River in western Butte County. Because the summer months are generally hot and dry, the risk of wildfires has historically been greatest in summer and fall. Relative humidity is also an important fire-related weather factor. As humidity levels drop, the dry air causes vegetation moisture levels to decrease, thereby increasing the likelihood that plant material will readily ignite and burn; the risk of wildfire increases when lightning strikes occur during dry periods.

Wind is a primary weather factor of wildfire behavior. Easterly winds (winds that blow from the east) are common above 3,500 feet in elevation; average wind speeds are less than 8 miles per hour. As wind speeds increase, the rate of fire spread, intensity, and ember spread potential also increases. Gusty and erratic wind conditions can cause a wildfire to spread irregularly, making it difficult to predict its path and effectively deploy fire suppression forces. North to northeast winds in the summer and fall compound the severity of fire conditions, as well as low relative humidity. The community of Yankee Hill/Concow is especially affected by northeast winds because the north fork drainage of the Feather River creates a wind tunnel effect. Northeast winds are especially dangerous because they are accompanied by low humidity, which can dry out trees and other fuel that may also be weakened by the winds. This can increase wildfire conditions in the area. Wind shifts can also occur suddenly due to temperature changes and interactions with steep slopes or hillsides, causing fires to spread unpredictably.

Fall has historically been one of the most dangerous times for wildfire risk, as periods of very high temperatures, low humidity, and strong wind increases cause red flag warnings and extreme fire danger. Wildfires can easily ignite during these periods, as was the case during the 2018 Camp Fire and 2020 North Complex Fire.

ii. Fuel

A large portion of Butte County is covered by natural vegetation, which provides fuels such as grass, brush, and timber for wildfires Each type of vegetation contributes to fire hazard severity to varying degrees. The qualities of vegetation which directly influence fire risk include fuel type and size, loading, arrangement, chemical composition, and dead and live fuel moisture, which contributes to the flammability characteristics of the vegetation.[6]

Western Butte County is covered in grass fuel types, which include dead grasses and lead litter. These fuel types react quickly to changes in weather such as low humidity or high wind speeds. Fire in this area can spread quickly in gusty wind conditions. Areas between 1,000 feet and 2,000 feet in elevation are dominated by brush vegetation, which is likely to burn in later summer fires due to low fuel moisture. These fires can be difficult to control, especially on steep slopes and during high wind events. The mountainous areas in eastern Butte County are dominated by timber fuels, which also burn easily in later summer with low fuel moisture. These fires can become very difficult to control due to steep slopes in mountainous areas and hot, dry winds.

[6] Butte County. 2019. Local Hazard Mitigation Plan, Chapter 4: Risk Assessment. http://www.buttecounty.net/Portals/19/LHMP/2019/CH4ButteCountyLHMPUpdateChapter4RiskAssessment.pdf?ver=2019-11-13-122000-400.

iii. Topography

Steep terrain or slope plays a key role in the rate and direction in which wildfires spread since fires will normally burn much faster uphill. When the gradient of a slope doubles, the rate of spread of a fire will also likely double.[7] Much of the topography in eastern Butte County is carved out by rivers and creeks, creating deep canyons and very steep slopes in areas along the Feather River watersheds and moderately steep and brush filled areas within the Butte Creek and Chico Creek watersheds. Fire suppression in steep areas is complicated by limited accessibility, and the effectiveness of firefighters and equipment is further hampered by terrain and the lack of access roads.

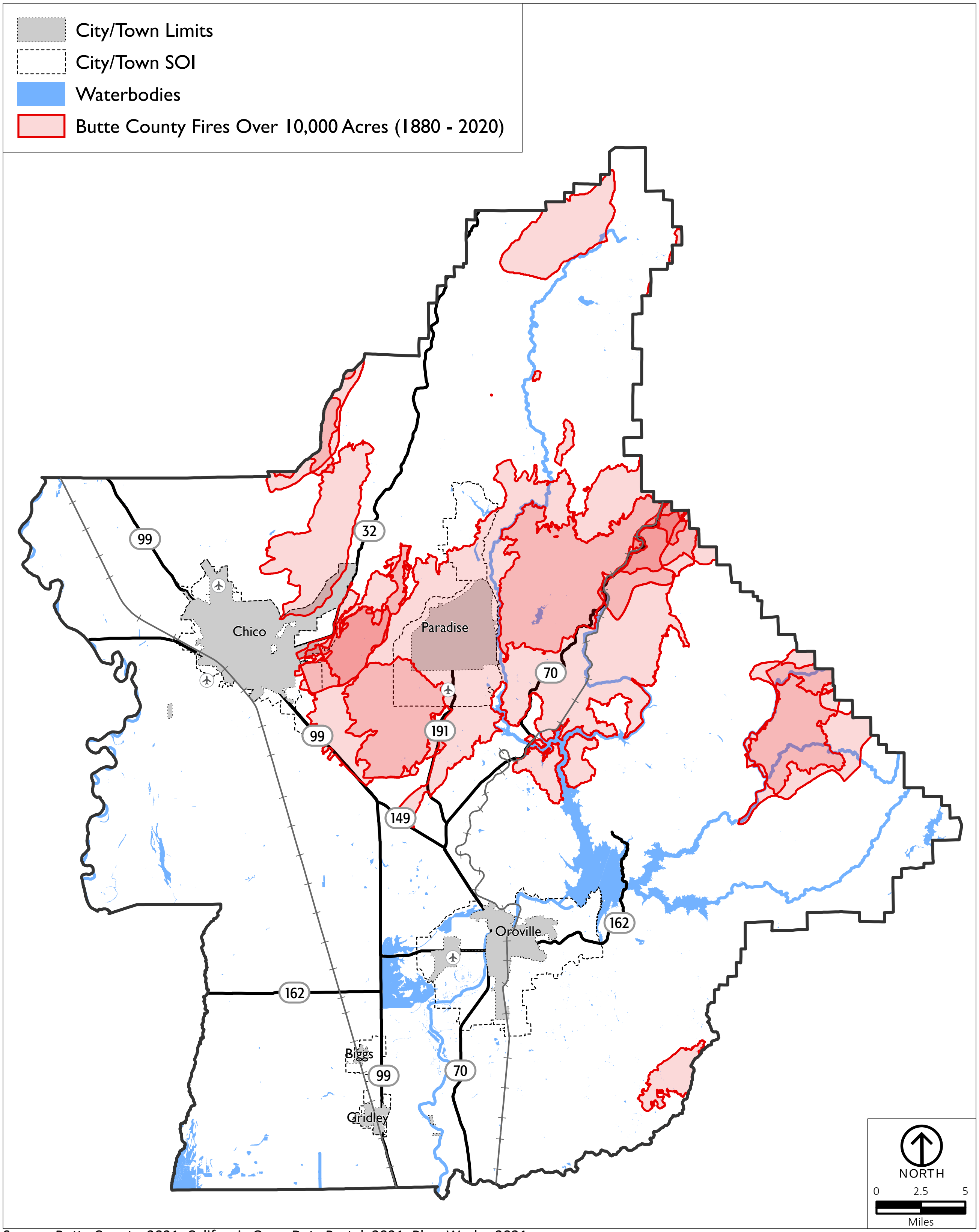
iv. Human Actions

Most wildfires are ignited by human action, the result of direct acts of arson, carelessness, or accidents. Many fires originate in populated areas along roads and around homes and are often the result of the careless disposal of cigarettes, mowing of dead grass, electricity equipment malfunction, use of equipment or burning of debris. Recreation areas with increased human activity that are located in high or very high fire hazard areas also increase the potential for wildfires to occur.

v. Climate Change

Climate change is likely to increase temperatures, including creating warmer temperatures earlier and later in the year, and cause droughts to occur more frequently, which dry out soils and vegetations. Droughts often kill plants and trees, which serve as additional fuel for wildfires. These factors are expected to increase wildfire conditions, creating a risk of more frequent and intense wildfires. Because wildfires burn the trees and other vegetation that help stabilize a hillside and absorb water, more areas burned by fire may also lead to an increase in landslides and floods. Historically, an average of 5,606 acres burned annually in the county. Figure 17-3 shows historic wildfire perimeters in the county. Wildfires are project to increase to an annual average in the county of 8,562 acres burned by 2050 and an annual average of 14,132 acres burned by 2100.

[7] Butte County. 2019. Local Hazard Mitigation Plan, Chapter 4: Risk Assessment. http://www.buttecounty.net/Portals/19/LHMP/2019/CH4ButteCountyLHMPUpdateChapter4RiskAssessment.pdf?ver=2019-11-13-122000-400.



Source: Butte County, 2021; California Open Data Portal, 2021; PlaceWorks, 2021;

FIGURE 17-3

HISTORIC WILDFIRE PERIMETERS

b. Secondary Effects of Wildfires

Wildfires are a regular feature of California's landscape. Some ecosystems are dependent upon recurrent fire to survive and have adapted to re-establishing themselves after a fire. This is common in the chaparral and conifer forest vegetation communities, which typically have a very high wildfire risk. However, climate change is likely to increase wildfire frequency and intensity above historic occurrences, which may make it harder for these ecosystems to re-establish themselves. After a high intensity wildfire, or crown fire, is suppressed, the burn scar is typically bare of its vegetative cover, which had supported the hillsides and steeper slopes. The intense heat from the fire can also cause a chemical reaction in the soil that makes it less porous, and the fire can destroy the root systems of shrubs and grasses that aid in stabilizing slope material. As a result, rainstorms increase the possibility of severe landslides and debris flows.

In addition to damaging natural environments, wildfires can injure and cause fatalities of residents and firefighters, in additional to damaging or destroying structures and personal property. Wildfires also deplete water reserves, down power lines, disrupt communication services, and block evacuation routes, which can isolate communities. Communities such as the Upper Ridge, Concow, Berry Creek, Feather Falls, Stirling City, and Brush Creek can become isolated if wildfires block access roads and evacuation routes. Wildfires can also indirectly cause flooding if flood control facilities become inadequate to handle increases in storm runoff, sediment, and debris that are likely to be generated from burn scars.

c. Historic Wildfires in Butte County

CAL FIRE maintains a list of historic fires throughout the state. According to CAL FIRE, Butte County has experienced several large and damaging wildfires in the eastern portions of the county and in the WUI. Table 17-1 lists historic wildfire incidents greater than 10,000 acres that have occurred within the county from 1887 to 2020.

TABLE 17-1 HISTORIC WILDFIRES OVER 10,000 ACRES IN BUTTE COUNTY, 1887 TO 2020

Year	Fire Name	Burned Acres	Cause
1918	N/A	22,232	Miscellaneous
1926	N/A	12,536	Miscellaneous
1927	N/A	27,841	Unknown
1931	N/A	42,078	Miscellaneous
1943	Pine Creek	11,360	Miscellaneous
1951	Milk Ranch	12,979	Miscellaneous
1999	Musty	16,757	Lightning
1999	Doe Mill	10,857	Lightning
2008	BTU Lightning Complex	53,699	Lightning
2008	Humboldt	23,344	Arson
2008	South-Frey	12,402	Lightning
2017	Cascade	16,141	Unknown
2018	Camp Fire	153,336	Powerline
2020	North Complex Fire	318,935	Lightning

Source: CAL FIRE, Fire and Resource Assessment Program. 2020. "California Fire Perimeters – 1887 to 2019". https://services.arcgis.com/jIL9msH9OI208GCb/arcgis/rest/services/California_Fire_Perimeters_1878_2019/FeatureServer accessed February 17, 2021.

The largest fires of the recent past were the Camp Fire in 2018 and the North Complex Fire in 2020, as shown in Figure 17-4. The sections below provide additional details about these two recent fires.

i. Camp Fire, 2018

In November 2018, Pacific Gas and Electric (PG&E) notified customers for two days that it might shut down power due to a forecast of high winds and low humidity, and a red flag warning issued by the National Weather Service, but ultimately PG&E did not de-energize the power lines. On Thursday, November 8, 2018, around 6:15 a.m., a power transmission line above Poe Dam near Pulga malfunctioned and sparked. A fire under power transmission lines near Poe Dam was reported to CAL FIRE by a PG&E Rock Creek Powerhouse field crew at 6:33 a.m. By 8:00 a.m., the fire entered the Town of Paradise and evacuation orders were sent out for the Town, the Upper Ridge community, and surrounding areas. The emergency alert system faltered due to its opt-in nature and the loss of 17 cell towers, and the majority of residents in the area did not receive emergency notifications.

By November 10, the Camp Fire had become the most destructive fire in California's history. The fire spread rapidly and firefighter crews were unable to fully contain the fire until November 25, after rain fell on November 21. While the majority of damage occurred in the Town of Paradise, several unincorporated communities and areas were also damaged or destroyed. In the unincorporated areas of the county, 4,569 structures were completely destroyed, 194 were damaged, and only 2,402 structures within the fire perimeter remained undamaged.[8]

In total (including the Town of Paradise), the Camp Fire directly and indirectly caused 87 fatalities, including three CAL FIRE personnel and 84 residents. The Camp Fire burned 153,336 acres and destroyed 14,500 structures, including 13,696 single-family homes, 376 multi-family homes, 528 commercial structures, and 4,293 other structures. Approximately 589 additional structures were also damaged. The fire, by far, killed more people and destroyed more structures than any other fire in California's recorded history.[9]

ii. North Complex Fire, 2020

On Monday, August 17, 2020, a lightning storm hit Plumas National Forest in Butte and Plumas Counties. The lightning sparked 21 fires in the area, including the Sheep Fire near Susanville, the Claremont Fire near Claremont Creek just south of Quincy, and the Bear Fire in the Middle Fork canyon near the Pacific Crest Trail. On September 5, 2020, the Sheep Fire was declared a separate incident, but strong winds caused the Bear Fire and Claremont Fire to explode and merge into the North Complex Fire.[10]

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[8] Butte County. 2019. Local Hazard Mitigation Plan, Chapter 4: Risk Assessment. http://www.buttecounty.net/Portals/19/LHMP/2019/CH4ButteCountyLHMPUpdateChapter4RiskAssessment.pdf?ver=2019-11-13-122000-400.

[9] Butte County District Attorney, The Camp Fire Public Report: A Summary of the Camp Fire Investigation, June 16, 2020, https://www.buttecounty.net/Portals/30/CFReport/PGE-THE-CAMP-FIRE-PUBLIC-REPORT.pdf?ver=2020-06-15-190515-977

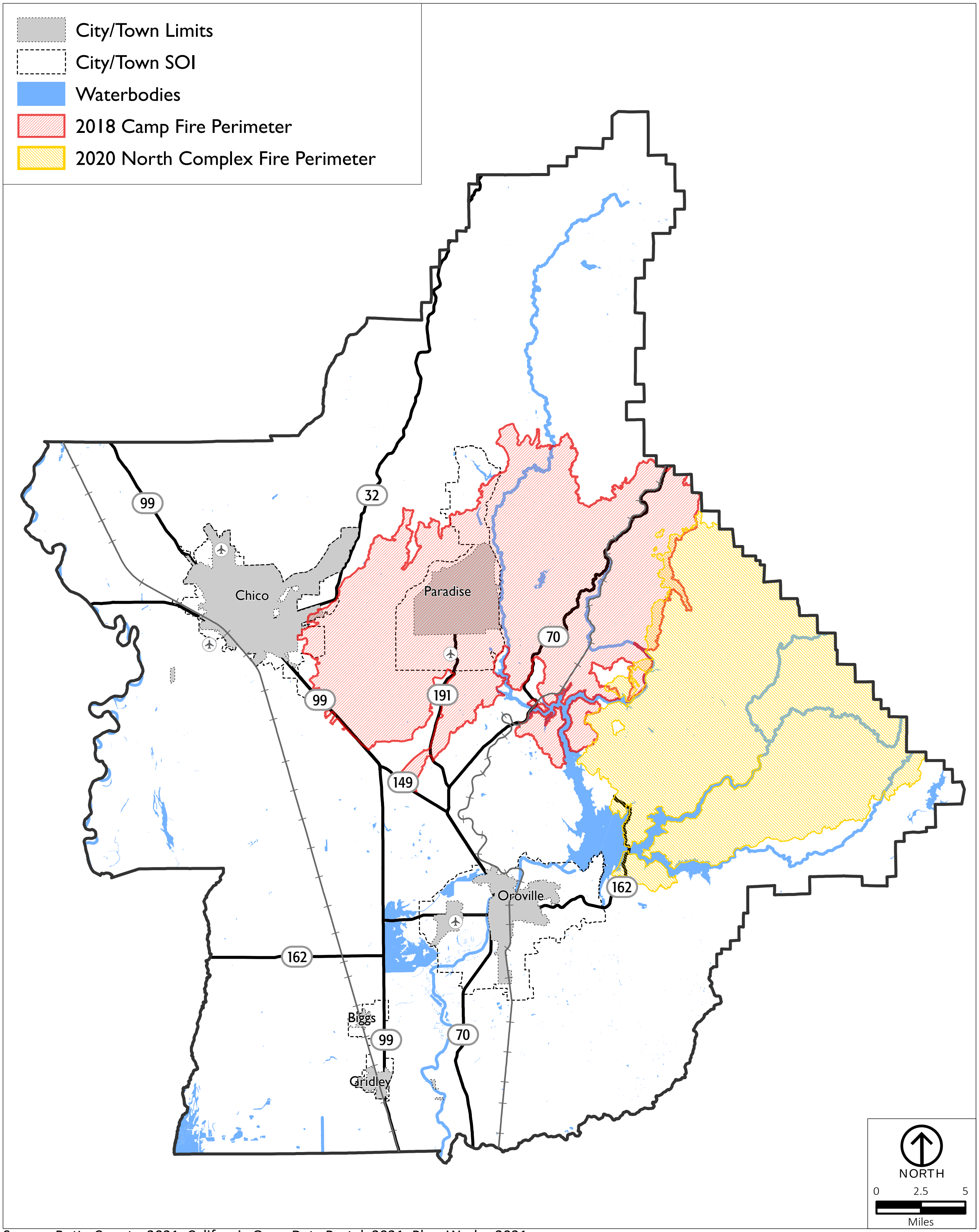
[10] U.S. Forest Service, Plumas National Forest. 2020. North Complex. https://inciweb.nwcg.gov/incident/6997/, accessed February 18, 2021.

The communities of Berry Creek, Feather Falls, Clipper Mills, Brush Creek, Woodleaf, and Forbestown were evacuated with little warning in the afternoon of September 8 due to the rapidly spreading fire. On September 9, 2020, the fire had burned through Berry Creek and Feather Falls, leaving few structures untouched by the flames and the majority of structures completely destroyed. Throughout September 2020, the winds shifted and strong sustained high winds occurred many times, causing the fire to move northeast towards Quincy, north towards Bucks Lake, west towards Concow and the Town of Paradise, south towards Forbestown, and east towards La Porte and Little Grass Valley. The fire burned for three more months.[11]

On December 3, 2020, Plumas National Forest officials announced that the North Complex Fire was 100-percent contained. The North Complex Fire burned 318,935 acres, including completely destroying the communities of Berry Creek and Feather Falls. By December 3, the fire had caused 16 fatalities and damaged or destroyed 2,455 structures within both Butte County and Plumas County. The North Complex Fire was the sixth largest, the fifth-most destructive, and the fifth most deadly wildfire in California's recorded history.[12]

[11] U.S. Forest Service, Plumas National Forest. 2020. North Complex. https://inciweb.nwcg.gov/incident/6997/, accessed February 18, 2021.

[12] U.S. Forest Service, Plumas National Forest. 2020. North Complex. https://inciweb.nwcg.gov/incident/6997/, accessed February 18, 2021.



Source: Butte County, 2021; California Open Data Portal, 2021; PlaceWorks, 2021;

FIGURE 17-4

CAMP FIRE AND NORTH COMPLEX FIRE PERIMETER MAP

2. Structural Fires

Structures face risks from fires that may start inside the structure as well as those that may spread from outside, including from wildfires. Structural fires can spread to other structures or spread into wildfires, causing additional needs for firefighting resources. Structural fire risks are greatest in older structures and neighborhoods built before modern building codes for fire safety and building fire suppression systems were in place. Other factors affecting structural fire risk, potential of loss of life, or damage to property include building age, height, and use; storage of flammable material; building construction materials; availability of sprinkler systems; and proximity to a fire station and hydrants.

There are a number of methods that can be employed to minimize the extent of damages to structures. The CBC and the California Fire Code provide several standards to reduce structural fires, such as the establishment of fire-resistance standards for fire doors, building materials, and particular types of construction in high fire hazard severity zones; requirements for smoke-detection systems; exiting requirements; and the clearance of debris. Automatic sprinkler systems are required in all new homes countywide, a subdivided parcel, and on properties larger three acres. Public Resource Code 4290/4291, described in Section A above, calls for the creation of defensible space around structures and requires that properties within the SRA or VHFHSZ must maintain 100 feet of defensible space around structures and buildings to protect them from an approaching wildfire and to keep a structural fire from spreading into additional WUI areas. Other methods include the use of non-combustible building materials in the construction of new dwellings and adequate separation or protection of structures to minimize the threat of a conflagration.

C. Fire Prevention and Response

This section describes the agencies responsible for fire prevention and response and concludes with an assessment of water supply.

1. Agency Responsibilities

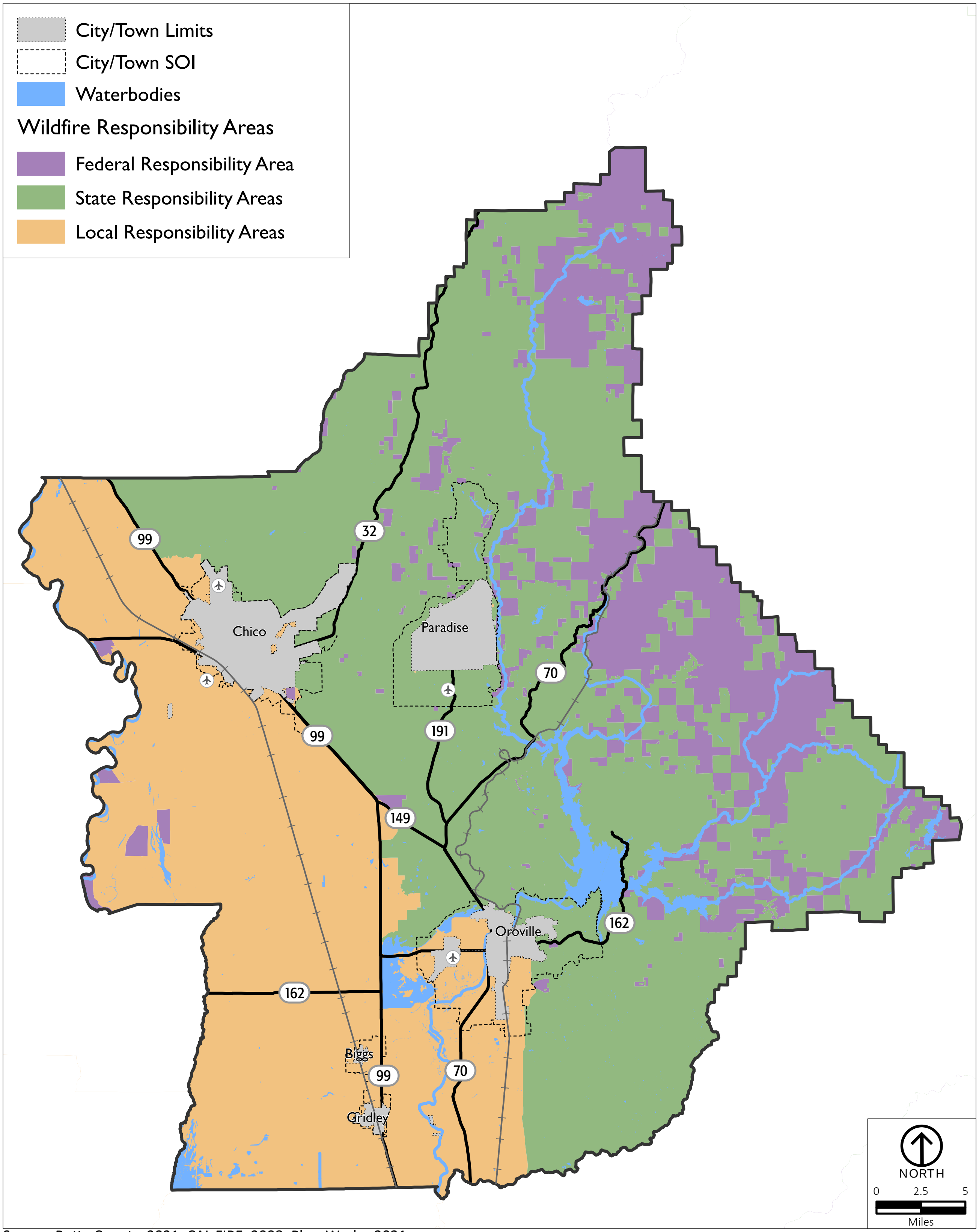
The responsibility for the prevention and suppression of wildfires in Butte County belongs to the Butte County Fire Department (BCFD), with support from CAL FIRE and the U.S. Forest Service Plumas National Forest Unit and Lassen National Forest Unit. BCFD provides fire protection to the unincorporated areas of Butte County, the Cities of Biggs and Gridley, and the Town of Paradise. The El Medio Fire Protection District used to provide fire protection services to the unincorporated area south of Oroville; however, the District stopped operating on

December 25, 2020. The BCFD, in conjunction with the City of Oroville, has agreed to provide fire protection services within the El Medio Fire Protection District service area until an official agreement for services is completed. The U.S. Forest Service provides wildfire prevention and suppression on lands within the Plumas National Forest and Lassen National Forest. The U.S. Forest Service also provides firefighters, aircraft, and equipment to help other agencies when firefighting assistance is needed.

Since 1931, CAL FIRE has provided staffing to the Butte County Fire Department through an annual cooperative agreement with the County. Under the terms of this agreement, the County funds CAL FIRE professional command, fire-fighting, and administrative staff to operate BCFD. Through this arrangement, CAL FIRE and BCFD function together as a fully consolidated fire protection agency and provide cost-effective fire protection service for Butte County. Figure 17-5 shows the Wildfire Responsibility Areas in the County.

a. Service

BCFD provides emergency services to all of Butte County, protecting over 1,600 square miles, several municipalities, and an unincorporated population of approximately 67,640 residents. BCFD services are provided by 18 career-staffed fire stations and 16 volunteer fire stations, and include fire control for structural, vegetation, vehicular and other unwanted fires; emergency medical service, technical rescue response; hazardous materials response; flood control assistance; fire prevention and public safety education; fire law enforcement/arson investigation; and vegetation management. In addition, BCFD operates county-wide dispatch services, coordinates major emergency response within the county as the Office of Emergency Management's mutual aid coordinator, and provides training for career and volunteer fire fighters.



Source: Butte County, 2021; CAL FIRE, 2008; PlaceWorks, 2021

FIGURE 17-5

WILDFIRE RESPONSIBILITY AREAS

In 2020, CAL FIRE and BCFD's Emergency Command Center (ECC) processed 12,293 calls for service, more than two thirds of which were for emergencies such as medical services, traffic collisions, and public assistance.[13] BCFD also responded to 679 fires, of which 273 were vegetation fires.[14] In 2020, the BCFD responded 12 times to incidents involving chemicals or other hazardous materials. Other responses, such as public assists, hazardous conditions, false fire alarms, assists to other agencies, totaled 2,285 responses.

In addition to fire engine responses, in 2019 the BCFD Fire Center provided 45,490 hours in fuel reduction project work, including controlled burns and fire crew training. The Fire Prevention Bureau also assisted with 297 law enforcement incidents and completed 5,156 defensible space inspections across the county.[15]

b. Automatic Aid Agreements

The BCFD has established automatic aid agreements with other fire protection agencies to provide optimal fire protection service to the entire county. Mutual aid agreements require a specific request for help on an incident-by-incident basis, while automatic aid agreements allow the resources nearest to an emergency situation to be dispatched on the first alarm regardless of the jurisdiction. BCFD has automatic aid agreements with all fire-fighting agencies in the county, with the U.S. Forest Service, Lassen and Plumas National Forests, Hamilton City, Glenn County, Sutter County, Tehama County, several fire districts in Yuba County, the City of Chico Fire Department, and the Town of Paradise Fire Department. Additionally, the BCFD/CAL FIRE ECC provides dispatching services for the Oroville Fire Department.

c. Volunteer Fire Companies

BCFD is supported by 124 volunteer fire fighters. These volunteers are organized into 18 local companies and are an integral component of the fire protection system in Butte County. The volunteer companies are dispatched by the CAL FIRE/BCFD ECC as needed and make up an essential part of the County fire

[13] Gaddie, John, Fire Captain. Communications conducted on Thursday February 25, 2021.

[14] Gaddie, John, Fire Captain. Communications conducted on Thursday February 25, 2021.

[15] Butte County Fire Department. 2019. Butte County Cooperative Fire Protection Annual Report. http://www.buttecounty.net/Portals/14/2020%20updates/BTU%20Emergency%20Response%20Report%202019%20Final%20Final.pdf?ver=2020-06-16-070758-563.

protection system, often providing the first response to an emergency in the rural portions of the county that are some distance from a BCFD or CAL FIRE station.

Although the volunteer companies are organized within and supported by the local communities, they operate as part of the county-wide fire protection system and receive regular training by the BCFD and CAL FIRE career fire fighters. Recruitment and retention continue to be a problem within the BCFD volunteer fire company program. This is not a problem unique to the fire service in Butte County. Over the past four years, BCFD volunteer numbers have decreased by 17 percent.

The volunteer facilities include shared stations with BCFD, stand-alone stations, and in a few cases, stations in name only, where the equipment is kept outside. The volunteer companies and locations of fire stations are listed and shown in Chapter 7, Public Services (see Table 7-1 and Figure 7-2).

d. Organization

BCFD is organized into three divisions. The North Division and the South Divisions comprise the field operations that provide emergency response within the county. Additionally, the North and South Divisions are responsible for the Training and Safety Bureau and the Chico Air Attack Base. The Administrative Services Division provides dispatch, maintenance, fire prevention, personnel, finance, and other support services to BCFD.

The North and South Divisions are divided into seven battalions, each of which is comprised of a mixture of BCFD and CAL FIRE stations and volunteer fire companies. Within the county there are 18 fire stations staffed with career fire fighters. The North and South Divisions also include 18 volunteer fire companies and the Chico Air Attack Base located at the Chico Municipal Airport. The stations are operated by career-staffed personnel, which include 71 personnel in the summer and 44 personnel in the winter.[16]

CAL FIRE and BCFD provide fire suppression services to approximately 1,600 square miles of both unincorporated and incorporated Butte County. As the major firefighting force in the county, these entities maintain 39 fire stations and support facilities either fully or cooperatively. CAL FIRE and BCFD also maintain a fleet of

[16] Gaddie, John, Fire Captain. Communications conducted on Thursday February 25, 2021.

firefighting equipment in Butte County, including 51 frontline fire engines, three aircraft, ten squads/rescues, two bulldozers, 14 water tenders, as well as hazardous materials units and heavy rescue vehicles.[17]

CAL FIRE, United States Forest Service (USFS), and the Bureau of Land Management (BLM) have entered into a mutual aid agreement for the purpose of wildfire protection in Butte County. Such agreements are reciprocal arrangements in which fire protection agencies share personnel and equipment during emergency situations. The Plumas National Forest, Lassen National Forest, the cities of Chico, Gridley, Biggs and Oroville, and the Town of Paradise are all signatories to automatic aid agreements with both CAL FIRE and BCFD. CAL FIRE and BCFD are also participants in the State of California Master Mutual Aid agreement. CAL FIRE also has cooperative agreements with the Cities of Gridley and Biggs for fire protection.

CAL FIRE has undertaken a program under the California Fire Plan to assess the fuel conditions, asset vulnerability, weather severity and level of fire protection services in Butte County. These assessments are performed annually and documented in CAL FIRE's Butte Unit Fire Management Plan, which provides the basis and guidance for the Unit's fire planning and hazardous fuel reduction efforts.

2. Water Supply

The ability of BCFD to control wildfires and structural fires depends on several components, one of which is the adequacy and availability of water supply. New subdivisions and commercial developments are required to install a pressurized water system with minimum water flows to meet the requirements of the Butte County Code of Ordinance, Chapter 20, Article VI, Subdivision Design Standards. This is accomplished through connections to an existing water purveyor or by establishing a private water source controlled by a County Service Area (CSA). Access to this water system and the spacing of the fire hydrants is also determined by Butte County Code of Ordinance, Chapter 20, Article VI, Subdivision Design Standards.

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[17] Butte County Fire Department. 2019. Butte County Cooperative Fire Protection Annual Report. http://www.buttecounty.net/Portals/14/2020%20updates/BTU%20Emergency%20Response%20Report%202019%20Final%20Final.pdf?ver=2020-06-16-070758-563.

In areas where no community water system exists, water for fire protection is furnished by the County's 14 water tenders which are strategically placed around the county to supplement the fire engines responding to fires. As the population continues to grow in the WUI areas, additional water tenders will be required to keep pace with growth. Water tenders are staffed by citizen volunteer firefighters, which may limit a rapid response in some cases.

3. Wildfire Mitigation Programs and Projects

The Butte County LHMP, which is updated and implemented through the County OEM, contains wildfire mitigation actions to help reduce wildfire risk in the unincorporated areas of the county. Fuel reduction and maintenance projects are included for the communities on the Upper Ridge, Concow/Yankee Hill, Berry Creek, Butte Meadows, Cohasset, Forest Ranch, Feather Falls, and Forbestown, which have all been affected by one or more of the fires listed in Table 17-1. Other wildfire mitigation projects include eave vent replacement and education projects, firewise communities and education programs, a fuel reduction chipper program, a fuel reduction resident assistance program, Camp Fire hazard tree removal, California Department of Water Resources Fuel Load Management Plan, and refuge areas for those areas that may be evacuation-constrained.

III. HAZARDOUS MATERIALS

A hazardous material is a substance or combination of substances which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either (1) cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating irreversible illness; or (2) pose a substantial present or potential hazard to human or environmental health and safety when improperly treated, stored, transported, or disposed of. Examples of hazardous materials include flammable and combustible materials, corrosives, explosives, oxidizers, poisons, materials that react violently with water, radioactive materials, and chemicals. Hazardous materials are mainly present because of industries involving chemical byproducts from manufacturing, petrochemicals, and hazardous building materials. There are also naturally occurring hazardous materials in Butte County such as asbestos and heavy metals.

Hazardous waste is the subset of hazardous materials that has been abandoned, discarded, or recycled and is not properly contained, including contaminated soil or groundwater with concentrations of chemicals, infectious agents, or toxic elements sufficiently high to increase human mortality or to destroy the ecological environment. If a hazardous material site is unused, and it is obvious there is no realistic intent to use the site, it is also considered to be a hazardous materials site.

A. Regulatory Setting

1. Federal Laws and Regulations

At the federal level, the chief environmental regulator for California is the U.S. Environmental Protection Agency (EPA), Region IX. The EPA maintains authority and oversight for cleanup of federal lands and waterways. Much of this authority and attention paid to hazardous materials and environmental contamination stems from the Clean Water Act (CWA), which was enacted by Congress in 1972 and amended several times since inception. It is the primary federal law regulating water quality in the United States and forms the basis for several State and local laws throughout the country. Its objective is to reduce or eliminate water pollution in the nation's rivers, streams, lakes, and coastal waters. The CWA prescribed the basic federal laws for regulating discharges of pollutants and set minimum water quality standards for all waters of the United States.

Other essential hazardous materials regulations at the federal level include the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984; the Comprehensive Environmental Response, Compensation, and Liability Action and Superfund Amendments and Reauthorization Act of 1986; the Emergency Planning Community Right-to-Know Act; and the Hazardous Materials Transportation Act. Each of these regulates the management, storage, and transport of hazardous materials, as well as the clean-up process if a spill were to occur.

2. State Laws and Regulations

California Health and Safety Code Section 25531 incorporates the federal law as it pertains to hazardous materials. This includes development of a Risk Management Plan (RMP) for facilities that store or handle acutely hazardous materials in reportable quantities. California Code of Regulations (CCR) Title 8 requires facility owners to prepare and implement safety management plans where large quantities of hazardous materials are handled. The Uniform Fire Code has requirements for the storage and handling of hazardous materials. Gasoline and propane, including aboveground and underground storage tanks for petroleum and natural gas fuels, are a common hazardous material throughout the County.

In California, regulation of hazardous materials falls under the authority of the California Environmental Protection Agency. This large agency includes the California Integrated Waste Management Board (CIWMB), responsible for oversight of solid waste disposal, and the Department of Toxic Substances Control (DTSC), which is chiefly responsible for regulation, handling, use, and disposal of toxic materials in California.[18] The State Water Resources Control Board (SWRCB) regulates discharge of potentially hazardous materials to waterways and aquifers, and administers the basin plans for groundwater resources in the various regions of the State.[19] Locally, the Central Valley Regional Water Quality Control Board[20] oversees surface and groundwater quality in Butte County. Programs intended to protect workers from exposure to hazardous materials and from accidental upset are covered at the federal level under the Occupational Health and Safety Administration (OSHA) and at the State level through the California Division of Occupational Safety and Health (CAL/OSHA),[21] and the California Department of Health Services (DHS). Air quality, including regulation of toxic and hazardous air emissions, is regulated through the California Air Resources Board (ARB), and, on a local level, the Butte County Air Quality Management District.

Hazardous materials and contaminants are regulated locally by the Butte County Department of Public Health, Environmental Health Division. The Environmental Health Division was certified by the California Environmental Protection Agency as the Certified Unified Program Agency (CUPA) for Butte County, effective February 1, 2005. CUPA programs include the Aboveground Storage Tank Program, Hazardous Waste Treatment Program, CalARP Program, Underground Storage Tank Program, Hazardous Materials Release Response Plan Program, Environmental Investigation Wells, and the Hazardous Waste Program.

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[18] California Environmental Protection Agency, 2006, *The History of the California Environmental Protection Agency,* Cal EPA website, http://www.calepa.ca.gov/About/History01/dtsc.htm, Accessed March 5, 2007.

[19] State Water Resources Control Board, 2006, SWRCB web site http://www.swrcb.ca.gov/ Accessed on March 5, 2007.

[20] North Coast Regional Water Quality Control Board website; http://www.waterboards.ca.gov/northcoast/ Accessed on March 5, 2007.

[21] Division of Occupational Safety and Health, 2006, DOSH website http://www.dir.ca.gov/dosh/ Accessed on March 5, 2007.

The Hazardous Materials Program within the Public Health Department is the County program responsible for overseeing the use, storage, and disposal of hazardous materials within Butte County. The program's major oversight responsibilities include:

- Reviewing, approving, and monitoring Hazardous Material Management (Business) Plans, as required by State law. These plans are required of all county businesses, including government agencies that store or handle hazardous materials in amounts equal to or exceeding 55 gallons, 500 pounds, or 200 cubic feet of gas (at standard temperature and pressure).
- Monitoring the installation, removal, and leakage of underground and aboveground petroleum fuel storage tanks.
- Inspecting businesses and reviewing permit conditions and procedures for the handling, storage, use and disposal of hazardous materials.

Hazardous Materials Release Response Plans are used to keep track of the use of hazardous materials by businesses in accordance with State and federal laws. This program is based on the Hazardous Waste Control Law found in the California Health and Safety Code Division 20, Chapter 6.5, and regulations found in the California Code of Regulations, Title 22, Division 4.5.[22] This program of the CUPA also regulates the generation, storage, transportation, treatment, and disposal of hazardous wastes.

In 2006, the Butte County Environmental Health Division launched a program to identify businesses that may generate or treat hazardous waste. Such businesses may be identified on the basis of (1) registration with the State Department of Toxic Substances Control, (2) inclusion in a list of businesses that typically use hazardous materials, and (3) departmental knowledge of businesses through other program activities or an allied agency referral.

Additional CUPA program elements include inspection of hazardous waste tanks and containers and overseeing aboveground hazardous material storage tank facilities.

[22] Code of California Regulations, Title 22, Division 4.5, CCR Title 22 unofficial website, http://www.dtsc.ca.gov/LawsRegsPolicies/Title22/index.cfm Accessed on March 5, 2007.

Regulation and permitting of potentially hazardous emissions into the atmosphere are handled by the Butte County Air Quality Management District (BCAQMD). The three main enforcement tools applied by the District are the Notice of Noncompliance (NON), the Notice to Comply (NTC) and the Notice to Apply for a Permit (NTA). These notices are a formal record of the District's finding that a violation of the State or federal Clean Air Act or District regulation affecting air quality has occurred. In most cases, taking corrective action and paying a penalty can settle a violation. An NON can also involve monetary penalties, civil suits, or criminal prosecution in failure to respond, repeated violation or serious pollution cases. Following noticed public hearings, the Governing Board of Directors adopts the District's rules and regulations, which control emissions from such things as open burning, incineration, smoke, dust, odors, gasoline, paint, and other sources of particulate or gaseous emissions.

In addition to the above sources, illegal dumping is a significant contributor to hazardous waste. Chapter 49 of the Butte County Municipal Code includes a statute that makes illegal dumping a misdemeanor offense with fines to those found culpable.

B. Existing Conditions

This section describes the existing conditions and resources pertinent to hazardous materials use, transport, disposal, and recycling in Butte County. Information is drawn from records kept by the California Department of Toxic Substances Control, State Water Resources Control Board, Butte County Environmental Health Division, and other relevant documents.

1. Hazardous Materials Sites

This section describes documented hazardous materials sites in Butte County.

a. Department of Toxic Substances Control (DTSC)

A search of the DTSC database of hazardous materials sites[23] identified 27 active sites in Butte County, including four sites with active land use restrictions, five sites with certified and operation or maintenance status, two sites with an operating permit, and one site undergoing closure. These sites include areas within incorporated cities, as they still require permitting by the County Public Health

[23] https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=Butte+County , Accessed on February 19, 2021.

Department. Of these sites, two are listed as federal superfund sites: Koppers Industries, located off Baggett-Marysville Road in Oroville, and Western Pacific Railroad, located south of Oroville.

Victor Industries, a former metal tube and can manufacturing facility, produced flexible tubes and aerosol cans using lead and aluminum. From 1958 to 1985, the company used trichloroethylene (TCE) to clean its product-line machinery at the 20th Street and airport sites from as early as 1946 until 1958. In 1984, Volatile Organic Compounds (VOCs), primarily TCE, were detected in public drinking supply wells located at the airport. The DTSC issued a Remedial Action Order (RAO) in January 1989, and an Imminent and Substantial Endangerment (I/SE) Order was issued in November 1990 to the Responsible Parties (RPs). In 1994, a soil vapor extraction system (SVE) was installed as an interim remedial measure to remove soil and groundwater contamination near the source. The SVE system operated from January 1995 to January 1997 and removed approximately 3,804 pounds of TCE. The SVE system was shut down in 1997 due to low influent concentrations. In March 1994, a groundwater extraction system was installed to prevent further migration of the TCE contamination beyond the runway. As a result of contamination, future site uses such as a daycare facility, school, elder care facility, nursing home, or hospital are prohibited Groundwater extraction and treatment is ongoing and the site was be re-evaluated in 2008. The airport site was removed from the Department of Toxic Substances and Controls list, but the site on 20th Street is still active.

At the manufacturing facility on 20th Street in Chico, solvent waste was allegedly dumped on the ground. In 1985, the site was stabilized via a DHS enforcement action, which resulted in excavating the top six inches of contaminated soil. This site has been identified as a source of groundwater contamination in the southwest Chico plume. Nearby municipal wells screened in deep aquifer zones show detectable concentrations of TCE.

The site formerly owned by Koppers Industries, Inc. is located on a 200-acre parcel just south of the City of Oroville and 3,000 feet east of the Feather River. The site was used as a wood treating facility, which ceased operation in 2001 and was the main source of contamination. The U.S. EPA added the site to the National Priority List (NPL) in September 1984, and a consent decree for Remedial Design/Remedial Action became effective on February 7, 1992. Approximately 120,000 cubic yards of contaminated soil were excavated from the site in 1992. Groundwater was treated through a pump and treat system that was stopped in December 1995 due to the dramatic reduction in contaminant plume size.

Remaining levels of contaminants of concern on the property meet industrial standards for future development, but a zone of contaminated groundwater of approximately four acres remains. A deed restriction for the site was filed with Butte County on November 12, 2003.

The Louisiana Pacific (LP) Corporation-Chico facility was also a wood treatment plant. The approximately 140-acre property has recorded contamination from formaldehyde, pentachlorophenol (PCP), heavy metals, solvents and fuel oil wastes, which were released, buried and/or burned on-site. In March 1992, elevated concentrations of PCP were detected in on-site wells. According to the DTSC, contamination is limited by current pumping restrictions due to existing TCE contamination in the vicinity of the subject site. Soil was removed and disposed off-site in 1992. In 1995, arsenic contaminated soil was excavated, consolidated, and capped on-site. A groundwater pump-and-treat system was installed and operated from 1997 to 2003. Groundwater monitoring continues.

Another notable site in Butte County with active restrictions is the Western Pacific Railroad Co. (WPRR) property, located approximately one mile southwest of the City of Oroville. The 90-acre site traversed by the railroad has a small groundwater plume. The main contaminant of concern in the groundwater is chlorinated compounds, which were detected in an on-site public drinking water supply well in 1986. In 1990, the EPA placed the site on the National Priority List. In 1998, approximately 1,720 tons of polyaromatic nuclear hydrocarbons were excavated and disposed off-site. A deed restriction limiting future use to industrial activities only was recorded in 2001.

Two sites with an active status have been added to the Department of Toxic Substances and Controls list due to the 2018 Camp Fire and the 2020 North Complex Fire. The Ridgeview Continuation High School in the Town of Paradise has an active case as the Paradise School District prepares to build a new continuation high school at 5944 Maxwell Drive. The other site is Sampson Lode, which was burned in the 2020 North Complex Fire. This site is in an evaluation phase to assess contamination levels due to the wildfire.

b. Groundwater Plumes

Groundwater plumes form when contaminated or hazardous materials percolate down through the soil into the groundwater basin below. Three of the sites listed in the DTSC database are reported for contributing to groundwater contamination, especially in the Chico area. Many of these sites are also listed in the State Water Resources Control Board inventory of underground storage tanks and leaking underground fuel tanks.[24] Due to the concentration of industry around Chico, there are two large plumes, the North Central Plume and the Southwest Plume.

The North Central Plume is the largest groundwater plume in the Chico area, with concentrations of perchloroethylene (PCE) as high as 2,900 parts per billion (ppb). This plume caused at least two wells to be taken out of service in 1985 and abandoned by the California Water Service Company in 1990. Monitoring wells installed by the DTSC in 1988 showed both of the major drinking water aquifers, the Intermediate Zone Aquifer (IZA) and the deep Zone Aquifer (DZA), were contaminated with perchloroethylene (PCE). The Shallow Zone Aquifer (SZA) is also contaminated with PCE but it is not used for drinking water. Potential migration pathways are leaky sewer lines, dry wells, and general seepage of waste through unlined landfills or makeshift disposal areas. The DTSC has identified two dry cleaners as major contributors to the Central Plume: Flair Custom Cleaners and Esplanade Cleaners. In July 1995, DTSC installed a two-well pump-and-treat system as an interim remedial measure to provide source control within the aquifer immediately down-gradient from Flair Custom Cleaners. According to the DTSC, the system continues to remove significant amounts of PCE from the aquifer and appears to have been a significant factor in stabilizing the plume. In 2007, a Remedial Action Plan was finalized and three extraction wells and one monitoring well was installed in the shallow zone of the aquifer.

On the subject of the Southwest Plume, the Butte County Department of Public Health released a public notice regarding groundwater contamination in the Chico area on October 20, 2006. This action was required in accordance with the Safe Drinking Water and Enforcement Act of 1986 (Prop. 65). The notice described a sampling of a private well in the Miller Avenue area of west Chico which identified 150 parts per billion tetrachloroethylene (TCE), which is 30 times the maximum contaminant level for public water supplies. TCE is considered hazardous since it is known to cause nervous system depression (intoxication), liver and kidney damage, among other effects. The notice indicated that further sampling and testing of groundwater would be undertaken from a collection of monitoring wells installed and evaluated by the DTSC. Since TCE was previously identified in the late 1980's in the Miller Avenue and Northgate Avenue areas, the California Water Service Company extended public water mains to the affected neighborhoods in 1991. In January 1992, a carbon treatment unit was purchased and installed to decrease PCE

[24] http://geotracker.swrcb.ca.gov/, Accessed on February 19, 2021.

concentrations. After soil gas sampling conducted in 2001, quarterly groundwater monitoring was reinstated.

c. Burn Sites

Another class of hazardous materials sites that pose a particular threat to the atmosphere is burn sites, where waste is burned to reduce volume rather than being simply buried in the ground. Burn sites are seldom allowed in municipal areas, but in largely rural Butte County there are a few that have been designated.

In 2006, the DTSC certified the Allen Property Burn Piles, located at Nord and Esplanade highways in Chico, indicating that cleanup of the site was completed satisfactorily enough to allow future development to proceed. The cleanup stemmed from Butte County's concerns about public health after a construction firm, hired by the property owner to clear away and burn debris from the 70-acre site, burned PVC plastic irrigation hose and pressure-treated chromated copper arsenate post and treated wood trellis. Due to health and safety concerns, Butte County authorities stopped the burns and ordered the construction company to clean the site. DTSC testing of the burn piles revealed soil contaminated with arsenic. The burned material was excavated and transported to a permitted landfill. As a result of the unpermitted burning, the responsible construction firm was put on probation for three years and forced to pay a fine.

In 2005, the DTSC certified another burn site known as the Humboldt Road Burn Dump, also in Chico. This site, the City's primary disposal area, has been the subject of extensive investigation and contains large amounts of burn dump waste.

2. Hazardous Materials Transport

Nearly all of the hazardous materials transported through Butte County are carried by truck on the State Highway system. Highways that allow for hazardous materials transport include State Route (SR) 99, SR-149, SR-32, SR-191, SR-70, SR-162, and SR-45. County roads and city streets are used to transport locally generated wastes from the source to the regional highway system. The County has not quantified the amount of hazardous materials that are transported through it to adjoining counties or states.

Transportation of hazardous materials on the highways is regulated through the Federal Department of Transportation (DOT) and the California Department of Transportation (Caltrans). This includes a system of placards, labels, and shipping papers that must identify the hazards of shipping each class of hazardous materials. Existing federal laws which address risks associated with the transport of hazardous materials include the Materials Transportation Act, administered by the DOT. At the State level, Caltrans implements the DOT regulations and the California Highway Patrol (CHP) enforces them. Regulation of hazardous materials and wastes include the manufacture of packaging and transport containers; packing and repacking; labeling; marking or placarding; handling; spill reporting; routing of transports; training of transport personnel; and registration of highly hazardous material transport.

Little to none of the hazardous waste is currently transported through the county via rail. Historically, however, there has been considerable transport of hazardous materials by rail, and a number of investigations have documented contamination. One notable study is a public health assessment[25] of the Western Pacific Railroad Oroville Yard, located on dredger tailings east of the Feather River two miles south of Oroville. The Regional Water Quality Control Board (RWQCB) identified three primary sources of contamination on the site: a roundhouse or fueling area, an unlined surface impoundment, and an oil-water separator. The nature and extent of contamination is not well known due to a lack of sampling and analytical testing. However, heavy metals, chlorinated solvents, and petroleum hydrocarbons (including benzene, xylene, toluene, and ethylbenzene) are all identified as potentially occurring at this site and could represent a significant hazard.

3. Hazardous Waste Disposal

Butte County has no registered Class I landfill facilities, which are facilities able to accept hazardous waste. There are only two remaining Class I landfills in California permitted to receive untreated hazardous wastes: the Kettleman Hills facility in Kings County and the Casmalia Resources Facility in Santa Barbara County. The Butte County Hazardous Waste Management Plan identified that the amount of hazardous wastes produced or brought into the county cannot economically support the development of a Class I facility within Butte County.

The largest landfill in Butte County is the Neal Road Landfill, a Class III facility (one that can only accept non-hazardous waste), located at 1023 Neal Road. The Solid Waste Division of the Butte County Department of Public Works is responsible for operating this landfill and coordinates collection and disposal of solid waste with the cities in Butte County, as well as other public agencies such as the Regional Water Quality Control Board, Department of Toxic Substances

[25] http://www.atsdr.cdc.gov/hac/PHA/westernpacificrr/wpr_p1.html#backa, Accessed on March 5, 2007

Control, and the California Integrated Waste Management Board. The Neal Road Landfill was damaged during the 2018 Camp Fire, but the landfill received an emergency waiver to accept additional waste from the fire, such as ash, debris, concrete, and metals after the Camp Fire and 2020 North Complex Fire. According to County Public Works staff, the landfill is scheduled to close in 2048.

While there are no hazardous waste facilities for large volumes of waste, Butte County did assume responsibility of a permanent household hazardous waste collection facility in 2002, located adjacent to the Chico Airport and operated under contract by A/C Industrial Services, Inc. The facility provides a controlled environment for receiving and processing household hazardous waste from all residents of Butte County. Conditionally exempt small quantity generators can also use the facility. Household hazardous waste can also be disposed at the Recology facilities in Oroville, for City of Oroville residents and Recology customers. A mobile household hazardous waste program targets outlying areas of the county. Household hazardous wastes include antifreeze, motor oil, oil filters, latex and oil based paint, pesticides, herbicides, poisons, aerosols, gasoline, paint related products (thinner, stain, varnish, and lacquers), bleaches, polishes, solvents, batteries, household cleaning supplies, pool chemicals, hobby supplies, fluorescent light tubes, mercury thermostats and electronic waste, including computer monitors, televisions and other items containing cathode ray tubes.

Norcal Waste Systems in Oroville and Waste Management, Inc. in Gridley operates additional household hazardous waste facilities for the benefit of their customers concentrated in Oroville, Gridley, and Chico. Norcal Waste Systems operates a transfer facility at 2720 South Fifth Avenue in Oroville. Waste Management Inc. operates a transfer station off of Ord Ranch Road in Gridley.

The California Integrated Waste Management Board has estimated the percentage of waste in several categories,[26] including household hazardous waste and special wastes. The latter includes ash, sewage solids, industrial sludge, treated medical wastes, bulky items, tires, and composite waste. Out of an estimated 88,648 tons of residential waste, approximately 0.3 percent (196 tons) was defined as household hazardous waste, and 2 percent (840 tons) as special waste.[27] Out of an estimated

[26] http://www.ciwmb.ca.gov/Profiles/County/CoProfile1.asp?COID=4, Accessed on March 5, 2007.

[27] CalRecycle, 2014, Solid Waste Characterization Home, https://www2.calrecycle.ca.gov/wasteCharacterization/ accessed February 26, 2021.

1117,742 tons of commercial or business waste, approximately 0.1 percent (165 tons) was classified as household hazardous waste and 1.2 percent (1,448 tons) was classified as special waste.[28]

4. Hazardous Materials Emergency Response

Hazardous materials incidents result from cleanup of waste, especially drug labs, highway collisions involving tankers or other hazardous transporters, industrial accidents, accidental rupture of a pipeline or tank during construction or demolition, or from a natural disaster such as a flood or landslide which damages a hazardous materials container or pipeline.

Handling of such emergencies is regulated under both federal and State laws which are designed primarily to protect human health and, secondarily, to safeguard the environment. Minimum training is 40 hours in accordance with State law and is required of many contractors and truck drivers, most industrial workers, and emergency response personnel such as firefighters or policemen.

In Butte County, the Interagency Hazardous Material Team serves as first responders to hazardous materials incidents or emergencies. The team was first organized by the Butte County Fire Chiefs Association beginning in 1989 through the use of a Joint Powers Agreement. Team members are from the fire departments of Chico, Oroville, Paradise, Biggs, Gridley and Butte County, and CAL FIRE. The team is composed of 30 to 40 hazardous materials specialists and technicians, with additional technicians who provide support. The team staffs two units: Haz Mat 64, stationed at the Kelly Ridge Fire/Butte County Station, and Haz Mat 1, stationed at Chico Station 1. There are approximately 60 annual responses; drug labs and related waste are the main cause of incidents.

5. Naturally Occurring Asbestos

Naturally occurring asbestos (NOA) is a hazardous material associated with serpentine rocks, which are found in the foothill and mountain regions of Butte County. The amount of NOA present in such rocks can vary widely and is generally only hazardous when it is released into the air when broken or crushed. Additional information on NOA is provided in the Geologic and Seismic Hazards section of this chapter.

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[28] CalRecycle, 2014, Solid Waste Characterization Home, https://www2.calrecycle.ca.gov/wasteCharacterization/ accessed February 26, 2021.

IV. FLOODING AND DAM SAFETY

This section summarizes the major issues related to drainage and flooding in Butte County, and also provides a discussion of dam safety and hazards from dam inundation. As with most Sacramento Valley counties, Butte County is subject to flooding problems in its upland areas as well as the poorly-drained valley floor. Although Butte County's foothill and upland areas generally do not experience severe flooding, drainage problems in the Paradise and Butte Meadows areas do exist. Runoff from impervious surfaces is also a concern in the county, particularly as the surface area of impervious cover increases when new development occurs. While information on areas most affected by drainage issues and flooding is available for most of the county's incorporated cities, data on the severity of drainage problems in the unincorporated areas - which comprise much of the county - is more limited.

In general, this section focuses on western Butte County, where most drainage problems and documented flooding issues exist. Dam safety is also addressed in this section since it is a significant concern in portions of Butte County due to the presence of several large dams in the region and dams in other counties that drain into Butte County.

A. Physical Setting

1. Topography and Geography

The topography of the western Butte County is mainly flat, with minimal rolling terrain near the base of the foothills. Drainage within Butte County flows from the Cascade and Sierra Nevada mountain ranges and foothill areas in the northeast, toward the Sacramento Valley area in the southwest. Ultimately, all surface drainage ends up in the Feather or Sacramento Rivers by overland flow, tributary swales (a "swale" is a shallow, vegetated ditch), or perennial streams such as Butte Creek and Big Chico Creek. Surface conditions in western Butte County consist primarily of irrigated agricultural land and non-irrigated pasture. Chico and Oroville are the major urban areas in the western parts of the county. Smaller urbanized areas include the cities of Gridley and Biggs, and the unincorporated communities of Durham, Palermo, and Richvale.

Soils in western Butte County are comprised primarily of deposits from streams, flood basins and mountain runoff known as alluvium. The low-lying alluvium deposits consist of sand, gravel, silt, and small amounts of clay. The coarser alluvium soils located near the Sacramento River are more permeable, which means more storm water runoff is able to pass through them. Located primarily in south-central Butte County, the flood basin deposits are comprised of fine-grained material, principally silts and clays. The permeability of this soil is low, which provides favorable conditions for rice farming. Alluvial deposits at the bases of slopes or mountains, called alluvial fan deposits, consist of mixed sediments deposited by streams. Their infiltration rates are locally variable and have a broad range of permeability.

2. Major Drainage Basins

Drainage in Butte County can be separated into seven major planning watersheds designated by the Butte County Department of Water and Resource Conservation, including Big Chico Creek Watershed, Butte Creek Watershed, Dry Creek/Cherokee Canal Watershed, Feather River/Lower Honcut Creek Watershed, Lake Oroville/Upper Feather River Watershed, Little Chico Creek Watershed, and Pine Creek Watershed. All watersheds, including the Cherokee Canal and Feather River, drain into the Sacramento River and the Sacramento-San Joaquin Delta further to the south.

Unlike the eastern portion of the county, western Butte County contains few natural channels for drainage. Big Chico Creek, Butte Creek, Wyman Ravine, Rock Creek, and Clear Creek are the major tributaries feeding the Feather and Sacramento Rivers.

3. Precipitation

Annual precipitation levels vary widely throughout the county, from less than 18 inches in the western valley area to over 80 inches in the eastern Cascades and Sierra Nevada mountains. In general, higher levels of precipitation fall at higher elevations in Butte County. The majority of the precipitation falls as rain below 4,000 feet in elevation. Above 4,000 feet, a considerable portion of winter precipitation occurs as snow.

B. Flood Hazard Areas

Flood hazards in the county are based on a variety of studies and mapping, chiefly through FEMA flood mapping program, the United States Army Corp of Engineers San Joaquin River Basins Comprehensive Study, and the California Department of Water Resources floodplain awareness mapping. This section discusses floodplains, levee safety, floodplain development regulations, and dam inundation in the county.

1. Floodplains

Butte County has historically been subject to flooding from various rivers and creeks, especially from the Feather River and Sacramento River. The following are the primary areas subject to flooding within Butte County:

- Butte Creek
- Little Chico Creek
- Little Chico Creek Diversion
- Mud Creek
- Ruddy Creek and Ruddy Creek Tributary
- Sycamore Creek
- Wyman Ravine and Tributaries
- Comanche Creek
- Butte Basin Overflow area for the Sacramento River

Flooding has also historically occurred in low-lying areas, including Rock Creek and Keefer Slough, which have flooded several times in recent decades. These floods have inundated State Routes 99 and 32, as well as several county roadways, in addition to flooding residential and agricultural land near North Chico and the community of Nord. The Richvale area is also subject to flooding from the Dry Creek/Cherokee Canal, which includes rice research grounds, rice storage, and chemical storage facilities. While the risk of flood hazards has reduced in these areas due to State and federal flood control projects, facilities are still in need of improvement and flooding is still a major issue in Butte County.

The agencies with responsibility for flood protection in Butte County include the US Army Corps of Engineers (USACE), California Department of Water Resources (DWR), Central Valley Flood Protection Board (CVFPB), and Butte County Service Area 24. The USACE is responsible for federal levees and canals such as the Mud Creek earthen levees, Little Chico-Butte Creek and Butte Creek earthen diversions, the Cherokee Canal, and the Feather River earthen levees. DWR is responsible for maintaining the channels on Chico and Mud Creeks, as well as for operation and maintenance of levee facilities on Butte Creek, Cherokee Canal, Big Chico Creek as it runs through Chico, Little Chico Creek Diversion to Butte Creek, and the Sacramento River. The CVFPB is a permitting agency for development or encroachments within the 200-year floodplain of the Sacramento River. The Butte County Service Area 24 is responsible for the project levees on

Chico Creek, Mud Creek, and the Sandy Gulch (Sycamore to Mud Creek) Flood Control Project.

a. 100-Year and 500-Year Floodplains

FEMA prepares Flood Insurance Rate Maps (FIRMs) and provides guidance and requirements for floodplain management as part of the National Flood Insurance Program (NFIP). Since 1989, FEMA has changed its policy and all areas within Butte County have now been mapped with flood risks and identified Special Flood Hazard Areas (SFHAs). The most recent FIRMs were published in November 2018. FEMA manages the NFIP, which provides insurance to communities that participate in the program, and works with State and local agencies to adopt floodplain management policies and flood mitigation measures.

Federal flood insurance with a federally insured loan is required for any structure within a Flood Hazard Zone of A, AE, AO, or AH. More detailed information on FEMA flood zones, maps, and regulations may be found at http://msc.fema.gov/ and through the Butte County Department of Public Works.

A key element of the NFIP is the identification of floodplain boundaries, which are depicted on FEMA Flood Insurance Rate Maps and shown in Figure 17-6. The 100-year flood is a central component in FIRM mapping, which is considered a flood event that is likely to occur once every 100 years (i.e., it has a 1-percent chance of occurring in any given year). The 500-year floodplain includes areas that have a 1-in-500 chance of flooding in any given year (i.e., a 0.2-percent chance). FEMA mapping of flood hazards for all of Butte County has been completed with the most accurate and up-to-date information derived from the August 2017 FIRM mapping. The Butte County LHMP uses these same maps for the flood analysis.

Identified FEMA flood hazard zones in the county, as mapped in the 2017 FIRM under the countywide mapping program, are shown in Figure 17-6. Areas that are subject to flooding are indicated by a series of alphabetical symbols, indicating anticipated exposure to flood events:

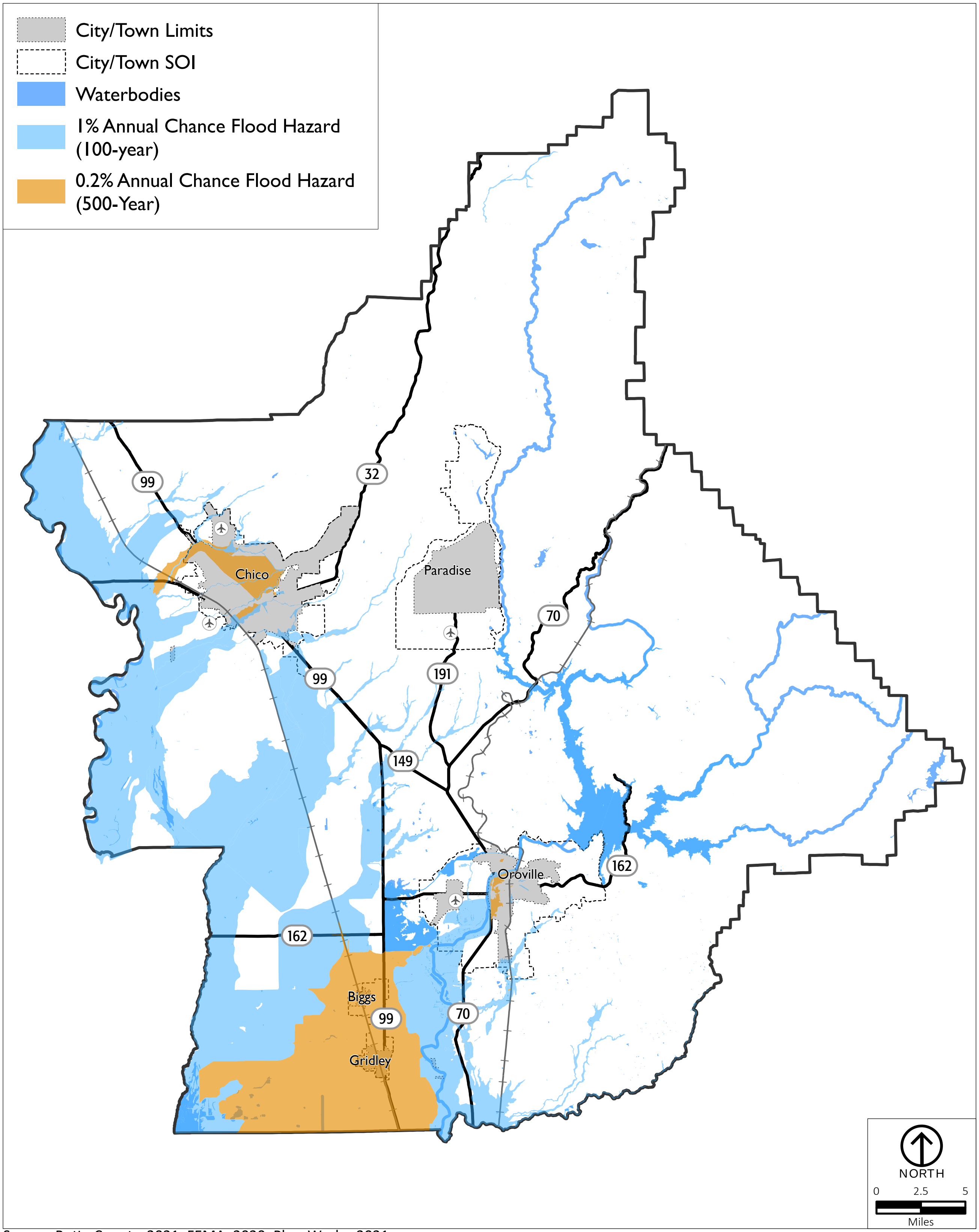
- ZONE A: Subject to 100-year flooding with no base flood elevation determined. Identified as an area that has a one percent chance of being flooded in any given year.
- ZONE AE: Subject to 100-year flooding with base flood elevations determined.

- ZONE AH: Subject to 100-year flooding with flood depths between one and three feet being areas of ponding with base flood elevations determined.
- ZONE AO: Subject to 100-year flooding with flood depths between one and three feet being subject to sheet flow on sloping terrain with average depths determined.
- "SHADED ZONE X": Subject to 500-year flooding. Identified as an area that has a 0.2 percent chance of being flooded in a given year.

FEMA mapping provides important guidance for the County in planning for flooding events and regulating development within identified flood hazard areas.

b. 200-Year Floodplains

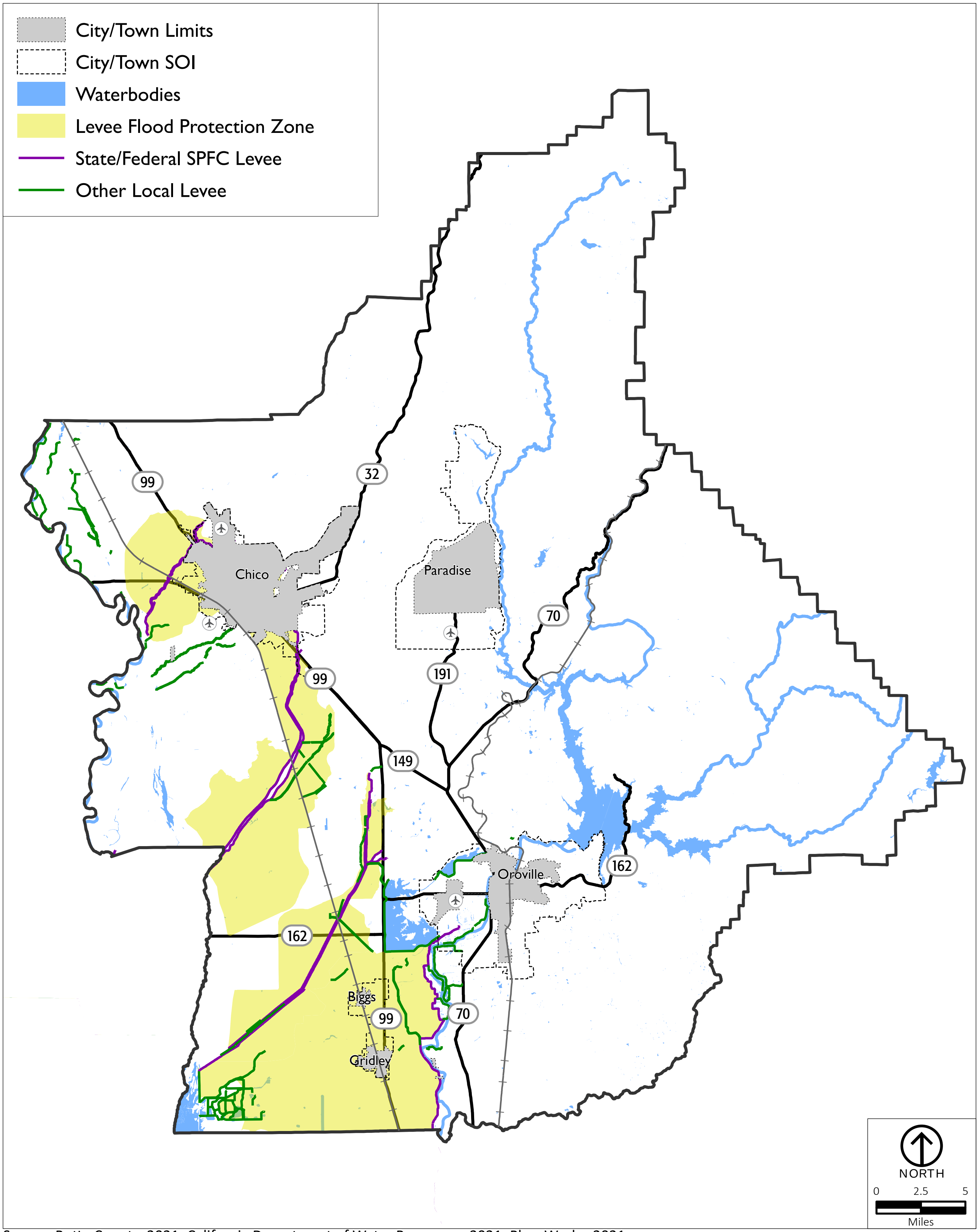
DWR and the CVFPB adopted the Central Valley Flood Protection Plan in 2012, pursuant to Assembly Bill 162 (2007). Assembly Bill 162 required Butte County to incorporate the Central Valley Flood Protection Plan measures into the Health and Safety Element of the General Plan by including the new 200-year floodplains, levees and levee flood protection zones, dam mapping and dam inundation zones, and a more extensive flood risk analysis. This analysis considers the DWR Best Available Maps (including the 200-year floodplain), the impact of local and regional flood protection projects on new development, and critical facilities and infrastructure at risk for flood damage. The maps are based on a 2002 study prepared by USACE focused on flooding along the Sacramento River, and a 2013 study prepared by DWR for flooding from the Feather River, Butte Creek, Mud Creek, Big Chico Creek, and other related tributaries confined to the Chico Urban Area. Figure 17-6 shows the 200-year floodplain and DWR Best Available maps.



Source: Butte County, 2021; FEMA, 2020; PlaceWorks, 2021;

FIGURE 17-6

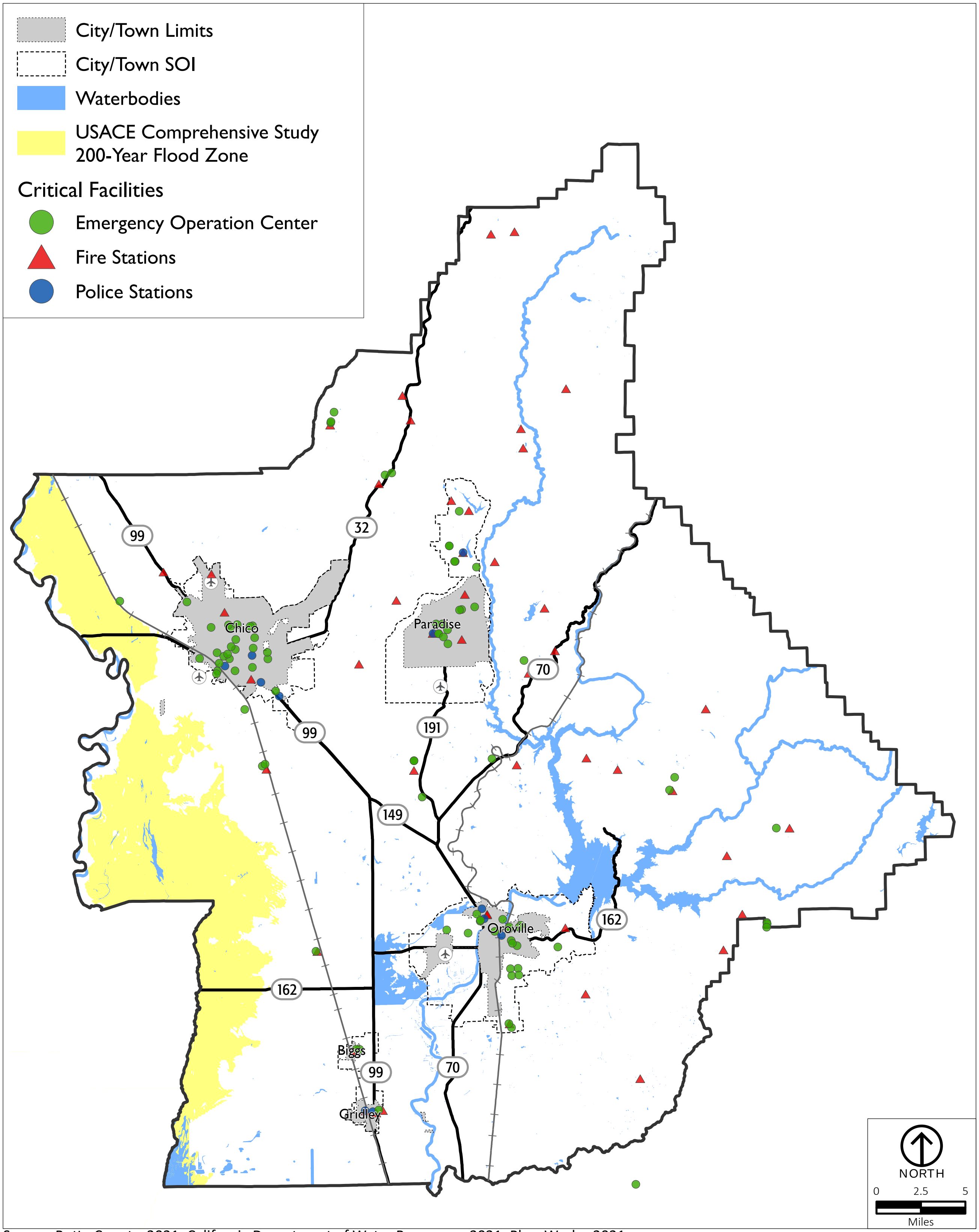
FEMA FLOOD HAZARD ZONES



Source: Butte County, 2021; California Department of Water Resources, 2021; PlaceWorks, 2021;

FIGURE 17-7

LEVEES AND LEVEE FLOOD PROTECTION ZONES



Source: Butte County, 2021; California Department of Water Resources, 2021; PlaceWorks, 2021; US Army Corps of Engineers Comprehensive Study, 2002

FIGURE 17-8

CALIFORNIA DEPARTMENT OF WATER RESOURCES BEST AVAILABLE MAP 200 YEAR FLOOD ZONE AND CRITICAL FACILITIES

As shown, the 200-year floodplains extend along Butte County's western edge. Portions of Chico and its sphere of influence are also shown to be within the 200-year floodplain. These portions are the only areas in the county that are urban or urbanizing and within the 200-year floodplain. Within this zone, the urban level of flood protection (ULOP) must withstand flooding that has a 1-in-200 chance of occurring in any given year. If a property is within the 100-year floodplain, the County must determine if additional ULOP measures apply to new development.

c. Climate Change

Climate change will likely alter the frequency, intensity, and duration of extreme storm events, including heavy rainfall. Precipitation is projected to increase from an annual average of 42.3 inches per year to 46.7 inches per year by mid-century.[29] While this is only a 4.4-inch increase, precipitation patterns are also likely to change. More rain may fall over fewer storms throughout the year, meaning the storms may become more intense but less frequent by mid-century. Due to projected temperature increases in Butte County, more precipitation may fall as rain instead of snow, increasing the amount of peak runoff downstream. These factors could lead to more flooding near rivers and creeks, as well as in low-lying areas in western Butte County. During large flooding events, areas in western Butte County may be susceptible to floodwaters from levee or dam failure. Dam failure is discussed in more detail below.

Floodwaters can be deep enough to drown people and may move fast enough to carry away people or heavy objects (such as cars). In some cases, floods can be strong enough to lift buildings off their foundations. Large flood events can affect lifeline utilities, transportation, jobs, tourism, the environment, agricultural industry, and the local and regional economies.

Approximately 489,421 acres, or 35 percent, of the unincorporated area of Butte County is in a flood hazard area.[30]

[29] California Energy Commission. 2018. "Annual Average Precipitation". https://cal-adapt.org/tools/annual-averages/, accessed February 22, 2021.

[30] Butte County. 2019. Butte County Local Hazard Mitigation Plan, Chapter 4: Risk Assessment.

2. Flooding Special Studies

As part of the 1989 FEMA map update referenced above, a series of special studies were conducted on Butte Creek, Wyman Ravine and its tributaries, Mud Creek, Keefer Slough, Ruddy Creek and its tributaries, and Little Chico Creek. Additional studies for the 1998 FIRM were undertaken for Butte Creek, Big Chico Creek, Little Chico Creek and Lindo Channel. For the 2000 FIRM, studies were performed on Keefer Slough, Rock Creek, Dead Horse Slough, and Wyman Ravine. While these areas were already known to flood, they had not been fully evaluated in past FEMA studies.

The following section summarizes the principal flood problems in Butte County, according to the 1998 Flood Insurance Study (FIS) and 2000 FIRM.

a. Butte Creek

Table 17-2 displays seven high discharge events on Butte Creek, as recorded by a gauge maintained by the U.S. Geological Survey (the gauge location is on right bank side, 7/10 mile downstream from Little Butte Creek and 7-1/2 miles east of Chico. The measurements at this gauge are preferable to measurements taken downstream by the California Department of Water Resources, because the USGS gauge is placed upstream of all development.

b. Wyman Ravine and Tributaries

As Wyman Ravine flows out of the steep foothills, its slope and velocity change downstream of Lincoln Boulevard. Shallow flooding occurs every few years in the orchards west of the Western Pacific Railroad and flood flows over Palermo Road have extended east of Wyman Ravine almost to Occidental Avenue. Also, Wyman Ravine between Stimpson Lane and Lone Tree Road experiences annual flooding in most years. Floodways are defined in the FIRMs.

TABLE 17-2 FLOODS ON BUTTE CREEK AND RECURRENCE INTERVALS

Year Ranked	Discharge	Annual Exceedance Probability=Recurrence Interval [a]
1997	35,600	0.0050=200 years USGS; 500 FIS
1986	22,000	0.0040=25 years USGS; 100 FIS
1965	21,200	0.0040=25 years USGS; 50 FIS
1956	18,700	0.0040=25 years USGS
1938	17,000	0.100=10 years USGS
1970	16,500	0.100=10 years USGS
1963	14,200	0.100=10 years USGS; 10+ FIS

[a] The reciprocal of annual exceedance probability = the recurrence interval; FIS = Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS).
Source: U.S. Geological Survey (USGS) data from flow gauge on Butte Creek.

The area south of Wyman Ravine tributary No. 1, between the Western Pacific Railway embankment and Melvina Avenue, experiences chronic flooding. The Palermo Tributary floods during the 10-year and greater storms.

Sheet flow across roads and between homes occurs approximately once every five years.

c. Keefer Slough and Rock Creek

Flooding along Keefer Slough is due to water naturally diverging from Rock Creek. The frequency of flooding has historically been dependent on the amount of debris and vegetation in Rock Creek between State Route 99 and its upstream divergence from Keefer Slough. Farmers in the vicinity have periodically cleared Rock Creek to improve capacity and flow west of State Route 99. However, flooding south of Rock Creek depends upon the channel conditions at the divergence of Keefer Slough from Rock Creek upstream from State Route 99. Recent flooding events of note occurred in March 1983, January 1995, March 1995, January 1997, February 1998, February 2004, March and April 2006, November and December 2012, and February 2019, when Keefer Slough flooded homes in the vicinity of Keefer Road, Keefer Slough, and the area southwest of State Route 99. The highway was covered with floodwaters for several hours during each of these events. The floodwaters continued southwest, affecting much of the area between State Route 99 and the Southern Pacific Railroad, including the community of Nord.

In 1995, flood studies were also conducted within the Keefer Slough watershed as part of the North Chico Specific Plan (NCSP). According to the Plan, the capacity of the Keefer Slough channel between Garner Lane and State Route 99 is estimated at 525 cubic feet per second (cfs) with the existing capacity of the State Route 99 crossing rated at 600 cfs. The drainage study also concluded that uncontrolled flooding in Keefer Slough was due to the natural divergence from Rock Creek. This flooding can be prevented by resolving the Rock Creek divergence problems as well as improving the flood capacity of Rock Creek. However, there are no formal flood control facilities along Keefer Slough and the slough runs on private property for its entire length.

Prior studies have indicated the possibility of routing the diverted overflow from its beginning point northeast of the Keefer Lane and Hicks Road intersection in a southerly direction to Mud Creek. However, a feasibility study being prepared by the U.S. Army Corps of Engineers found that it was not economically feasible to divert flows to Mud Creek. Therefore, the Rock Creek flood flows must either be contained in Rock Creek or improvements made to Keefer Slough to accommodate the flows. The feasibility study is leaning toward the former improvement. The NCSP also included other programs to alleviate flooding; however, these will require implementation actions by multiple State and federal agencies.

d. Mud Creek

The Sacramento District Corps of Engineers surveyed project levee crown elevations along Mud Creek and found that the levees are well-maintained, do not have any known stability or foundation problems and, with the exception of Sycamore Creek upstream from Sheep Hollow Creek, the levees will pass design flows for 100-year storm events, provided that maintenance continues.

e. Sycamore Creek

In March 2002, the California Department of Water Resources prepared a hydraulic analysis for Sycamore Creek and found extensive sedimentation and vegetative buildup along the creek between Cohasset Road and Sheep Hollow. This reduces the present capacity below the channel’s design capacity. The analysis recommends the removal of 49,000 cubic yards of sediment, some minor raising of the levee, and keeping vegetation in check.

f. Ruddy Creek and Ruddy Creek Tributary

Areas of flooding along Ruddy Creek have been noted throughout the basin. Flood damage was reported after the February 1986, January 1995, January 1997, and February 1998 storms. Since the 1989 FIS, widespread flooding was observed in the 1995, 1997, and 1998 winter seasons.

g. Little Chico Creek

The majority of this area was not depicted on previous FIRM panels as being subject to 100-year flood events. Flood flows of record occurred in December 1964, March 1974, March 1978, January 1995, and January 1997. Flooding also occurred with the latest storm in February 1998 when the largest 24-hour rainfall total occurred in 82 years in the Chico area. This caused a flood surge that resulted in flooding at the Alberton Avenue bridge, west of Chico.

3. Appraisal of Flood Protection Measures within Special Study Areas

Private levees have been erected along the banks of a large portion of Wyman Ravine. However, levees along the lower portions do not contain 10-year storm events[31] and their effectiveness during 100-year floods are negligible. A levee extending approximately 3,500 feet north of Palermo Road to 2,000 feet upstream of Lincoln Blvd is more significant.

Several levee systems have been constructed along Butte Creek, Cherokee Canal, Big Chico Creek, Hamlin Slough, the Little Chico Creek-Butte Creek Diversion Channel, Comanche Creek and Little Chico Creek. An evaluation of these levees found that they do not provide protection from 100-year flood events. Inadequate levees and/or channel capacities were found on portions of the following streams: Butte Creek downstream of the Skyway, Hamlin Slough, Little Chico Creek downstream of the Butte Creek Diversion Channel, Comanche Creek and Cherokee Canal. During intense storms, water would typically flow over the top of these levees and break out of the channel, usually not returning to the main channel for several thousand feet downstream, if at all. Therefore, they have been shown on the 2018 FIRM as within the 100-year floodplain.

Table 17-3 contains information on known flooding problems and planned drainage improvements as identified by the referenced studies. The table indicates the drainage problem or issue, the reference source, and the status of identified drainage problems. The County has several drainage impact fees for funding the

[31] As noted in FEMA FIS, page 7.

construction of storm drain facilities in specific drainage areas. Adopting such fees for specifically studied projects may help fund needed improvement projects.

C. Flood Control and Management

This section describes the primary strategies by which the County and other responsible agencies have sought to manage and control flooding risks. Flooding in Butte County threatens both life and property, and has historically caused significant damage and economic losses. The storms of March 1983, January-March 1995, December 1996, January 1997, February 1998, February 2004, March and April 2006, November and December 2012, February 2017, and February 2019 were particularly devastating. After floods occur, flood hazards in the county are re-evaluated in an effort to develop effective flood policies and implementation measures designated to aid in reducing adverse impacts resulting from flood events.

TABLE 17-3 IDENTIFIED FLOODING PROBLEMS IN BUTTE COUNTY

Study Location	Description of Problems Identified	Suggested Improvements If Any	Status [a]
Thermalito	Many existing conduits found to be inadequate to accommodate existing and near future flows. Many areas undrained due to lack of facilities.	Utilize natural drainage courses in conjunction with additional well- placed drainage improvements. Such improvements include new trunk lines, and several additional culverts and improvement of natural channels.	The Oroville Flood Risk Reduction Project was completed in 2020.
North Chico Specific Plan Area	Few existing drainage facilities to off-set increasing development resulting in increasing land divisions creating many small parcels.	Improvement of existing storm drain facilities, and addition of new facilities to serve ultimate urban development. New improvements include on-site detention to reduce peak runoff, a trunk facility with collector lines to areas without facilities and pump stations to Sycamore or Mud Creek.	Improvements to be constructed in accordance with North Chico Specific Plan and approved County drainage design criteria.
South-East Chico, Chapman Area	Little existing street improvements such as curbs, gutters, and sidewalks. No existing storm drain facilities in many areas.	Construction of storm drain facilities such as curbs and gutters and conduit. Adoption of drainage plan for area.	A portion has been implemented
Northern Butte County, North-West of City of Chico	Area plagued by recurrent flooding due to contributing upstream drainage area, a broad natural floodplain and poor channel alignment.	Install diversion/detention facilities to reduce/rechannel excess floodwaters to improvements constructed by Army Corps of Engineers south of area.	Status unknown or no action taken
South East of City of Oroville area called Wyman Ravine	Existing facilities are inadequate to handle existing and future flows.	Replace a series of undersized culverts and other drainage structures.	Shown on FEMA/FIRM maps.
City of Chico	A need to evaluate current facilities and plan for future development, by way of outlining planning criteria.	Create planning/design criteria which designates new facilities to meet future needs across jurisdictional boundaries.	City improvements to original Plan being reviewed by County. Not subject to jurisdiction of the County unless they are connecting to County maintained facilities.
Town of Paradise	Field inventory of existing drainage facilities shows that past adopted policies were many times ignored either through lack of knowledge or indifference.	Create planning criteria designating more strict and controlled regulation of development. Master plan provides developmental guidelines and a schedule of improvements for the planned area.	An incorporated area, not included in County General Plan. Not subject to Jurisdiction by Butte County.
City of Chico and Surrounding Area	Environmental impact report addressing the adoption of the Chico Urban Area Draft Storm Drainage Master Plan relating to a 5000 ac. Annexation.	EIR references prior City Master Plan in 1997 for future improvements of areas lacking in storm drain systems and strategies for improving areas with existing storm drain systems.	Adopted by City of Chico City Council on September 5, 2000.

TABLE 17-3 IDENTIFIED FLOODING PROBLEMS IN BUTTE COUNTY (CONTINUED)

Study Location	Description of Problems Identified	Suggested Improvements If Any	Status [a]
North of the City of Chico, Rock Creek- Keefer Slough Area	Location experiences flooding problems during periods of high intensity storms. Overland flow from approx. 50 sq. mile upstream tributary area causing significant flooding problems coupled with old channels within district boundaries and undersized culverts.	A U.S. Army Corps of Engineers (Corps) Feasibility Study will provide cost-of-solution data for the proposed improvements, such as setback levees, floodwalls, channels, and drainage structures. Study will enable local property owners to make a determination on funding projects. Complete the Rock Creek Keefer Slough Flood Plain Study and implement appropriate actions to reduce flooding.	The County conducted a Feasibility Study in 2017 to determine the most appropriate method to mitigate flooding problems related to Rock Creek and Keefer Slough.
East Chico Area: 1978 Rolls, Anderson and Rolls Study Area.	Only two areas were identified within the study area as having existing underground drainage facilities. Runoff calculations indicated the storm drains for both areas are undersized compared to the area being drained.	Study of drainage patterns shows the size and location for eight additional storm drains to drain the study area for both existing and future development.	The Chico Parks and Playgrounds Commission has a policy to review and minimize all additional storm drains into Big Chico Creek above One Mile Recreation Area.

[a] Status information provided by County of Butte staff.

1. Federal and State Flood Control Projects

The federal Flood Control Act of 1944 provided the authorization and funding for hundreds of dam and flood control projects across the United States and was intended to alleviate many of the dangerous and life- threatening flooding. In Butte County, the most notable of these projects was the construction of the Oroville Dam and its related flood control projects in the 1960s. The Act also designated flood control projects along the Sacramento River and its tributaries, including Mud Creek, Sandy Gulch, Big and Little Chico Creeks, Butte Creek, and Cherokee Canal.

More recently, the DWR, Division of Flood Management, has established the Sacramento River Flood Control Project to implement flood control projects for the entire Sacramento River system, including its tributaries. Two components of this project that fall within Butte County are the Chico Landing to Red Bluff Project and the Sacramento River Bank Protection Program.

The only state-maintained flood control system in the county for the Sacramento River is located south of Chico on the Sacramento River, within the Butte Basin overflow facilities. The M&T and Goose Lake weirs are maintained by the Department of Water Resources. The 3B's Overflow is an earthen weir prone to erosion, currently maintained by private parties. These structures regulate floodwaters associated with the Sacramento River at the Butte Basin overflow area. The project levees are designed to control the floodwater overflowing into Butte Basin by containing excess flow until the Sacramento River subsides. The Department of Water Resources, as an affiliate of the Sacramento River Bank Protection Program, maintains these facilities.

In November 2006, Propositions 1E and 84 passed as bond initiatives on the statewide ballot. These propositions allocate funding for some of the State's more urgent flood control and water quality issues, and could provide a key source of funding for the County and other local agencies in implementing flood control and drainage improvements. Senate Bill 45, the Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2020, passed in November 2020, and will provide additional funding for flood protection measures.

While large-scale flood control projects have mitigated some of the county's most serious flood hazards, many areas of Butte County remain vulnerable to flooding. In addition, the impact of flooding has become more acute in many places over recent decades because development has occurred in areas that were previously thought to be outside of the floodplains, but are now known to be flood-prone.

Thus, there remains an ongoing need for mitigation of flood hazards, including regulation of development in flood-prone areas and physical modifications and improvements to waterways and watershed areas. Some of these methods are described in subsequent sections.

In 2012, the Central Valley Flood Protection Plan was adopted by DWR and the CVFPB, requiring additional analysis of the 200-year floodplains, levees and levee flood protection zones, dam mapping and dam inundation zones, and a more extensive flood risk analysis. New development within the urban level of flood protection area that could be flooded with up to 3 feet of water must be built to withstand flooding that has a 1-in-200 chance of occurring in any given year. Levee Protection Areas are shown on Figure 17-7.

2. Butte County Development Regulations

As noted in Section B.1, regulation of development in known flood-prone areas, based on FEMA mapping, DWR Best Available Maps, and other information, is a key tool in reducing risks to life and property (see Figure 17-8, 200-Year Flood Zones and DWR Best Available Maps). Butte County has a number of programs in place and works closely with various State and federal agencies and local watershed groups as part of its overall flood management strategy. The key components of this strategy are described herein.

a. Flood Hazard Prevention Ordinance

The delineation of flood boundaries and adoption of County ordinances regulating development within identified floodplains/floodways are the basic flood management tools that the County uses to identify flood hazards and implement its own flood management program. FEMA's flood mapping program, the USACE Comprehensive Study 2002 maps, and the DWR Urban Level of Flood Protection Chico Area Study 2013 map, described in Section B, are critical components of these efforts.

A County ordinance adopted in March 1983 created a flood hazard prevention section, as set forth in Article IV in Chapter 26 of the Butte County Code. The Code assigns authority for enforcement of County flood hazard prevention policy to the floodplain administrator, in this case the Director of Development Services. The Code relies upon FEMA and FIS data, though other studies may supplement this data if the floodplain administrator recommends it, and the Board of Supervisors approves it. The Flood Hazard Prevention Ordinance appoints the Department of Development Services to review all applications for new construction or subdivisions within flood hazard areas. The ordinance's basic requirement, in order to reduce flood hazards, is that the lowest floor of any new construction or substantial improvement within Flood Zones A, AE, AH, and shaded Zone X be elevated one foot or more above the regulatory flood elevation. Also, it must be shown that development within the floodplain will not raise the existing flood level. There are other criteria for building within flood hazard areas, including flood-proofing nonresidential structures and designing structures to withstand hydrostatic pressures and hydrodynamic loads.

Within areas subject to flooding that are proposed for subdivision, the County is required to ensure the following:

- ♦ All such proposed developments are consistent with the need to minimize flood damage.
- ♦ Subdivisions and parcel maps shall, as a condition of approval, establish regulatory flood elevations and note same on final maps prior to recordation of the final map.
- ♦ Adequate drainage is provided to reduce exposure to flood hazards.
- ♦ All public utilities and facilities are located so as to minimize or eliminate flood damage.

Article IV, Flood Hazard Prevention, was most recently updated in November 2016. The Board of Supervisors also adopted Chapter 24-47.1, Urban Flood Protection Overlay Zone, into the Butte County Code. This section improves protections and limits damage from flooding within the county and its urban areas, including land within the 200-year floodplain with flood inundation of greater than 3 feet, as determined by the 2013 DWR study, described above.

b. Flood Hazard Mitigation Plan

The preparation of the Butte County Flood Mitigation Plan (Butte County FMP) was facilitated by Butte County Office of Emergency Services (County OES). The overall purpose of the Butte County FMP is to provide guidance to agencies and the public responsible for and interested in protecting life, property, and livestock; involved in land use planning; responsible for administering the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP), and responsible for responding to flood emergencies within Butte County.[32]

[32] Butte County Flood Mitigation Plan, Wood Rodgers, January 2006.

3. On-Site Flood Control Measures

Increased amounts of impervious surfaces, sloped contours, and drainage infrastructure in conjunction with urbanization results in more efficient channeling and diversion of storm water into a floodplain. Sometimes this efficiency creates a storm "surge," in which urban storm waters overtax the ability of natural river channels to drain floodwaters. A high 24-hour storm event can overload a drainage system if the area sheds water quickly. As the surge reaches critical height, flooding occurs downstream because runoff from other areas accumulates in the natural drainage system. In an alternative scenario, storm waters flood the city because they do not drain as quickly.

On a site-specific level, the most frequently used flood control technique utilized in the county is retention or detention of peak runoff, which aims to maintain peak runoff to, at, or below predevelopment levels. This typically involves use of on-site detention or retention basins or other holding facilities such as leach trenches or open drainage ditches, all designed to reduce the peak runoff from the site to, at, or below pre-development levels. Open ditches and detention basins slow the movement of storm water into the drainage systems and provide sediment settling areas for pollutants. Other site-specific techniques such as clustering buildings or constructing narrower paved streets can also serve a role in flood management by decreasing the overall amount of impervious surface in a development area and reducing the severity of storm surge events.

4. Comprehensive Watershed Management

Humans intervene in a watershed for a wide variety of purposes: to bring water to residences, irrigate, generate electricity, dispose of waste, mine, manage timber, recreate, enhance wildlife, and control floods. Scientific research has discovered that the cumulative effects of these activities over time can make flooding problems worse, a condition attributed to the alteration of the watershed's "dynamic equilibrium." As human activities within a watershed alter its natural balance, the flood volumes for various frequency storms within the watershed of a stream or river are also changed. Oftentimes, flood heights and velocities increase, necessitating higher levies, greater bank stabilization, channelization, and methods of reducing runoff through on-site detention or retention.

An alternate approach to flood control involves "comprehensive watershed management" (CWM). This approach does not rely solely on direct flood control measures; instead, it focuses on management of the floodplain by providing wider areas for flooding using a combination of setback levies, floodwalls, and other structural and non-structural designs. The CWM design concept allows for the natural development of riparian habitat within the floodplain, reduction in flood velocities, and reduction in the normal maintenance requirements. This approach to flood management has been gaining national and statewide consideration, and significant grant funding has been provided to foster the development of CWM plans.

In November 2016, the Upper Feather River Integrated Regional Water Management (IRWM) adopted the IRWM Plan, which provides a comprehensive set of projects for the watershed, including eastern Butte County. In March 2020, the Northern Sacramento Valley Integrated Regional Water Management Group adopted an updated IRWM Plan, which includes similar management projects and covers western Butte County. The IRWM plans cover multiple jurisdictions and special districts with the goal of cohesive management of these watersheds, including for flood, stormwater, and flood management.

Another alternative is to allow the river and floodplain to revert back to its natural system. Because this precludes all development within the floodplain and may also require the removal of existing development from the floodplain, such an alternative tends to be unpopular. Even so, some communities are attempting to correct poor watershed policy by restoring their watershed's dynamic equilibrium. For example, in 1998 Napa County approved an innovative ½-cent sales tax for flood control improvements. This will raise $6 million per year over 20 years for flood control improvements along the Napa River. The project is innovative because it does not support traditional methods of flood control, such as creating concrete channels to control floodwaters. Instead, the funds would be spent to "restore" the floodplain and create "meander belts" for the Napa River. Probably the most significant aspect of this measure is that funding will be provided to pay for the removal of homes and businesses in areas that flood frequently. Such a strategy could be employed by Butte County at a variety of scales for various flood-prone waterways but would likely require considerable planning and investment of resources.

D. Dam Safety

As of 2021, there are 24 dams in Butte County under the jurisdiction of the California Department of Water Resources Division of Safety of Dams (DSD). An additional 16 dams located in Plumas County and Shasta County have dam failure inundation zones that reach Butte County. Table 17-4 summarizes this information. A majority of these dams (19) are earthfill embankments while the others include six gravity concrete dams, six variable radius concrete arch dams, six rock embankment dams, and three hydraulic fill dams. The dams function in a variety of service capacities for the county and the State, including irrigation, recreation, stock watering, power production, and municipal water supply. The reservoirs contained by these dams range in size from 76 acre-feet to 4,552,000 acre-feet.

Division personnel inspect DSD jurisdiction dams each year. The DSD has also evaluated the seismic safety of the dams at Lake Wyandotte, Lost Creek, and Round Valley. As a result of the study done for Lake Wyandotte, the spillway has been lowered to contain the reservoir in the event of dam lowering in an earthquake. Lost Creek dam personnel submitted their study and are in the process of studying several faults of special concern. Round Valley has also submitted a study, which found the dam in compliance with earthquake standards. The main focus of this study was correcting seepage. According to the area engineer for the Division of Dam Safety, this problem has been corrected.

In 1992, Harlan Tate Associates studied Magalia Dam and concluded that the upstream slope of the dam was found to have inadequate stability under seismic loading conditions. As of 2003, the water level in the reservoir was lowered 25 feet due to seismic stability concerns. The County is undertaking preliminary engineering on a project to widen the Skyway across Magalia Dam. The Paradise Irrigation District's preferred alternative for the widening project involves stabilizing the dam and would permit the restoration of the design water level behind Magalia Dam. An Environmental Impact Report and project design was approved in 2005, but the project was not completed due to a lack of funding.

TABLE 17-4 DAMS UNDER STATE JURISDICTION, BUTTE COUNTY

Dam Name	State Dam No.	Owner	Inundation Map Status	Construction Type	Storage Capacity (acre-feet)	Year Completed
Dams within Butte County						
A L Chaffin	346-000	Estate of George R. Chaffin	X	Earth	450	1957
California Park	1340-000	California Park Association	Yes	Earth	335	1986
Cannon Ranch	345-000	Spring Valley Minerals	X	Earth	176	1870
Concow	67-000	Thermalito Water and Sewer District	X	Var. Radius Arch	6,370	1925
Desabla Forebay	97-005	Pacific Gas & Electric Co.	F	Earth	280	1903
Feather River Hatchery	1-047	Dept. of Water Resources	No	Gravity	580	1964
Forbestown Divers.	63-007	South Feather Water and Power Agency	F	Var. Radius Arch	358	1962
Grizzly Creek	349-000	Ronald T Dreisbach	X	Earth	76	1964
Kunkle	97-007	Pacific Gas & Electric Co.	Yes	Earth	155	1907
Lake Madrone	1004-000	Lake Madrone Water District	X	Earth	200	1931
Lake Wyandotte	63-000	South Feather Water and Power Agency	Yes	Earth	313	1924
Lost Creek	63-002	South Feather Water and Power Agency	F	Var. Radius Arch	5,680	1924
Magalia	73-000	Paradise Irrigation District	Yes	Hydraulic Fill	2,900	1918
Miners Ranch	63-009	South Feather Water and Power Agency	Yes	Earth and Rock	895	1962
Oroville	1-048	CA Dept. Water Resources	Yes (FERC)	Earth	3,553,405	1968
Paradise	73-002	Paradise Irrigation District	Yes	Earth	11,500	1957
Philbrook	97-008	Pacific Gas & Electric	Yes	Earth	5,180	1926
Poe	93-005	Pacific Gas & Electric	Yes	Gravity	1,150	1959
Ponderosa Diversion	63-008	South Feather Water and Power Agency	F	Earth	4,750	1962
Round Valley	97-009	Pacific Gas & Electric	Yes	Earth	1,147	1877
Sly Creek	63-006	South Feather Water and Power Agency	Yes	Earth	65,050	1961

TABLE 17-4 DAMS UNDER STATE JURISDICTION, BUTTE COUNTY (CONTINUED)

Dam Name	State Dam No.	Owner	Inundation Map Status	Construction Type	Storage Capacity (acre-feet)	Year Completed
Thermalito Afterbay	1-055	California Department of Water Resources	Yes	Earth	57,041	1967
Thermalito Diversion	1-049	California Department of Water Resources	Yes	Gravity	13,328	1967
Thermalito Forebay	1-054	California Department of Water Resources	Yes	Earth	11,768	1967
Dams Outside of Butte County						
Antelope	1-500	California Department of Water Resources	Yes	Earth	22,566	1964
Bucks Diversion	94-000	Pacific Gas & Electric	Yes	Var. Radius Arch	5,843	1928
Bucks Storage	94-200	Pacific Gas & Electric	Yes	Rock	103,000	1928
Butt Valley	93-000	Pacific Gas & Electric	Yes	Hydraulic Fill	49,800	1924
Caribou Afterbay	97-120	Pacific Gas & Electric	Yes	Earth and Rock	2,400	1959
Cresta	93-600	Pacific Gas & Electric	Yes	Gravity	4,400	1949
Frenchman	01-430	California Department of Water Resources	Yes	Earth	55,477	1961
Grizzly Forebay	94-300	Pacific Gas & Electric	Yes	Var. Radius Arch	1,112	1928
Grizzly Valley	1-520	California Department of Water Resources	Yes	Earth and Rock	83,000	1966
Lake Almanor	93-300	Pacific Gas & Electric	Yes	Hydraulic Fill	1,308,000	1927
Little Grass Valley	63-300	South Feather Water and Power Agency	Yes	Rock	74,730	1961
Lower Three Lakes	94-400	Pacific Gas & Electric	Yes	Rock	525	1928
Rock Creek	93-700	Pacific Gas & Electric	Yes	Gravity	4,660	1950
Shasta Lake	CA10186	Bureau of Land Reclamation	Yes (FERC)	Gravity	4,552,000	1945
South Fork Diversion	63-400	South Feather Water and Power Agency	X	Var. Radius Arch	88	1961
Whiskeytown	CA10204	Bureau of Land Reclamation	Yes (FERC)	Earth	241,100	1963

The DSD also identified an additional safety hazard at the Lake Madrone dam. The spillway is below the minimum design standard. This means it has been certified as safe for a flood expected to recur once every 500 years, but could fail or overflow should a larger flood, such as the one expected to recur once every 1,000 years (the design standard), occur. The design standard otherwise depends on construction type, terrain, seismic features in the area, and habitat (human and otherwise) in the downstream flood zone. Currently, the reservoir is under court order to increase dam spillway capacity. According to the DSD area engineer, Lake Madrone continues to defy a court order to correct its deficiencies; DSD is seeking further legal remedies to obtain compliance and correct this problem. Of the remaining dams, Kunkle is typical of several dams whose use has been restricted to a particular storage level. The DSD believes these dams are safe at a particular fill level and has restricted their use to that level or lower.

In February 2017, a heavy rainstorm caused flooding that damaged the main spillway of Oroville Dam on February 7. This caused DWR to stop the flow into the main spillway. The rain fell for several more days, causing the lake level to rise and flow over the emergency spillway, even when the main spillway was reopened to quickly drain the lake. The emergency spillway could not handle all the water, causing erosion to undermine the concrete weir. An evacuation order was given on February 12 for those living directly in the inundation zone, totaling approximately 188,000 people. Although no collapse occurred, the water further damaged the main spillway and eroded the bare slope of the emergency spillway. Following the February 2017 event, DWR initiated the Oroville Dam Safety Comprehensive Needs Assessment to assess risks associated with the Oroville Dam facilities and identify dam safety and operational needs. DWR and FEMA funded $1.1 billion in repairs to both the main spillway and emergency spillway. By 2018, the main spillway was fully reconstructed to final design and the emergency spillway was completed. Additional structures were added to the facilities to prevent uphill erosion if the emergency spillway is ever used again.

Inundation maps have been required since 1972, following the 1971 San Fernando Earthquake and near failure of the Lower Van Norman Dam. Inundation maps show areas that lie within the potential dam failure inundation zone. All inundation maps for Butte County are on file with the State Division of Dam Safety. Six dams do not have maps on file, and they have been requested. Two are regulated by the Federal Energy Regulatory Commission (FERC), but inundation maps are assumed to exist for these.

Figure 17-9 depicts the major dam inundation areas in Butte County as they pertain to the Oroville, Whiskeytown, Lake Almanor, and Shasta Dams.

V. SEISMIC HAZARDS

Seismic risk in Butte County results from active earthquake faults within the county, as well as from active faults outside the county whose seismic activity would cause potentially damaging ground motion in the county.

Earthquakes give rise to various seismic hazards including surface faulting, ground shaking, liquefaction, ground failure, and ground settlement. Seismic hazards vary widely from area to area, and the level of hazard depends on both geologic conditions and the extent and type of land use.

This section characterizes seismic hazards in Butte County and assesses the potentially hazardous effects of earthquakes. This section also contains information on other geologic hazards including erosion potential, subsidence, landslides, expansive soils, and volcanic hazards.

Earthquakes are typically measured in terms of magnitude and intensity. Earthquake "magnitude" is a measure of the total amount of energy released in an earthquake. With increasing magnitude (i.e., larger earthquakes) ground motions are stronger, last longer and are felt over larger areas. Earthquake "intensity" refers to the effects of earthquake-induced ground motions on people and buildings. Earthquake intensity is often more useful than magnitude when discussing the damaging effects of earthquakes. The most common intensity scale is the Modified Mercalli Intensity (MMI) scale, which ranges from I (Not Felt) to XII (Extreme). A summary of the observed effects corresponding to the various MMI levels is given in Table 17-5.

While intensity is a good measure of how a particular earthquake is felt, it is at best qualitative. A measure of the peak ground acceleration due to seismic waves offers a quantitative basis for structural design. Butte County lies in a zone that has estimated peak ground accelerations in hard rock ranging from 0.1-0.2 times that of gravity.[33] These values are estimated for "active" faults and do not apply for the potentially active faults in and around Butte County. Further, ground accelerations

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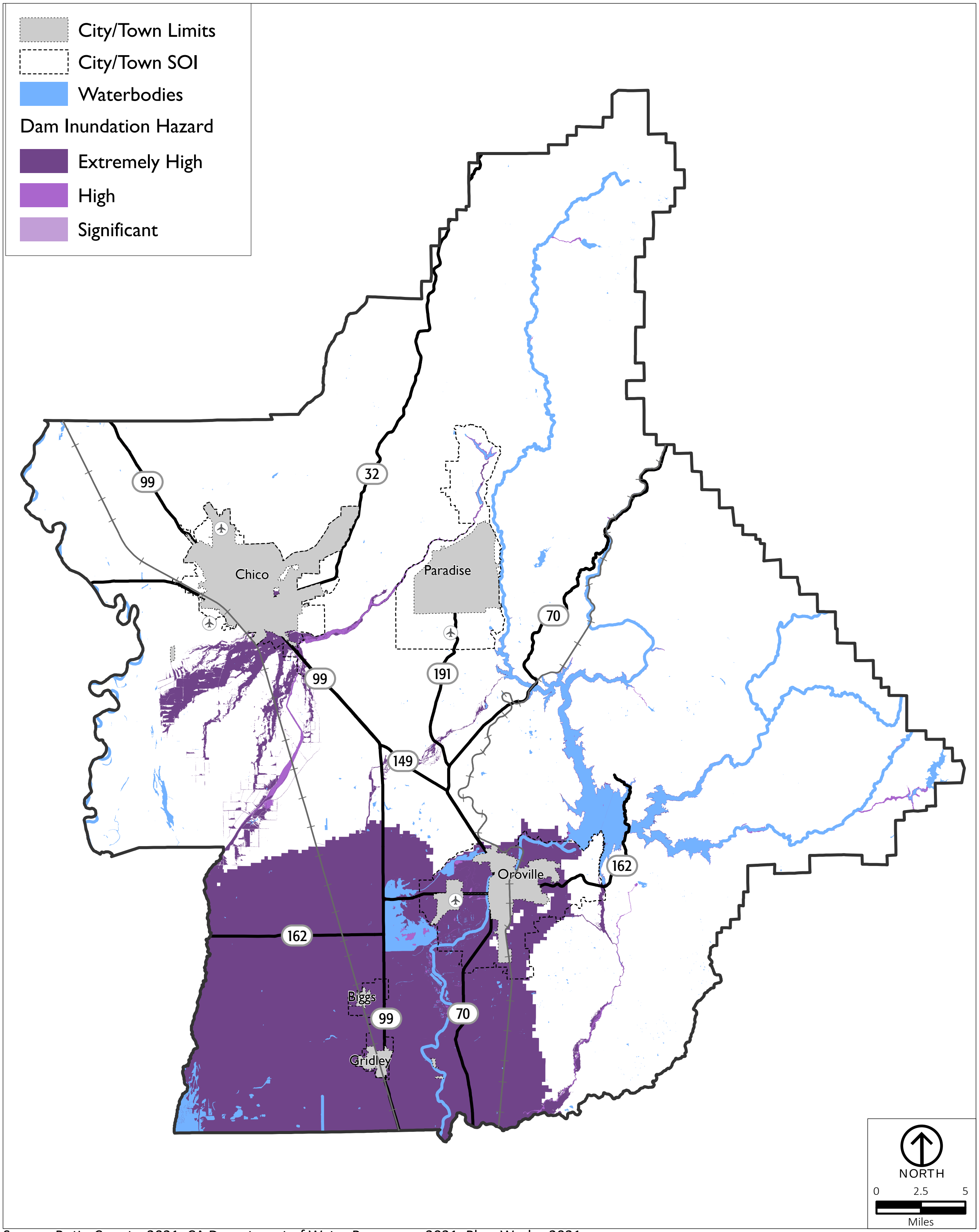
[16] California Geological Society Website, Accessed March 2007.

data do not account for site-specific conditions that may affect aspects such as the amplification of seismic waves by soft or loose underlying media. More specific information regarding amplification of seismic waves, liquefaction potential, lurch cracking, differential settlement, densification, seismically induced landslides, and other seismic hazards would need to be evaluated in a project-specific geotechnical investigation based on appropriate subsurface investigation, sampling, testing, and mapping.



Source: Butte County, 2021; CA Department of Water Resources, 2021; PlaceWorks, 2021;

FIGURE 17-9

DAM INUNDATION AREAS

TABLE 17-5 SUMMARY OF MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES

I.	Not felt except by a very few under especially favorable circumstances.
II.	Felt only by a few persons, especially on upper floors of buildings. Delicately suspended objects may swing.
III.	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.
IV.	During the day felt by many, felt outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V.	Felt by nearly everyone; many awakened. Some dishes, windows, etc. broken; a few instances of cracked plaster. Unstable objects overturned. Disturbance of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
VI.	Felt by all; many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
VII.	Everybody runs outdoor. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
VIII.	Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amount. Changes in well water. Disturbs persons driving motor cars.
IX.	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
X.	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.
XI.	Few, if any (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
XII.	Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into the air.

Source: K.V. Steinbrugge, 1982. *Earthquakes, Volcanoes, and Tsunamis, and Anatomy of Hazards.*

A. Regulatory Setting

1. State of California Regulations

The State of California has established a variety of regulations and requirements related to seismic safety and structural integrity, including the California Building Code, the Alquist-Priolo Earthquake Fault Zoning Act, and the Seismic Hazards Mapping Act.

a. California Building Code

The California Building Code (CBC) is included in Title 24 of the California Code of Regulations and is a portion of the California Building Standards Code. Under State law, all building standards must be centralized in Title 24, otherwise they are not enforceable. The CBC incorporates the Uniform Building Code, a widely adopted model building code in the United States. This Code provides minimum standards to protect property and public safety by regulating the design and construction of excavations, foundations, building frames, retaining walls, and other building elements to mitigate the effects of seismic shaking and adverse soil conditions. The CBC contains provisions for earthquake safety based on factors including occupancy type, the types of soil and rock on-site, and the strength of ground shaking with specified probability of occurring at a site.

b. Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The main purpose of the Act is to prevent the construction of buildings used for human occupancy on top of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.

The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones or Alquist-Priolo Zones) around the surface traces of active faults, and to issue appropriate maps. The maps are distributed to all affected cities, counties, and State agencies for their use in planning and controlling new or renewed construction. Local agencies must regulate most development projects within the zones and there can generally be no construction within 50 feet of an active fault zone. There is one Alquist-Priolo fault zone mapped in Butte County, the Cleveland Hills fault, which is described in greater detail below.

c. Seismic Hazards Mapping Act

The 1990 Seismic Hazards Mapping Act (SHMA) addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically-induced landslides. Under the Act, seismic hazard zones are to be mapped by the State Geologist to assist local governments in land use planning. The Act states that "it is necessary to identify and map seismic hazard zones in order for cities and counties to adequately prepare the safety element of their general plans and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety." Section 2697(a) of the Act additionally requires that "cities and counties shall require, prior to the approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard." All of Butte County has been identified as a Seismic Hazard Zone by the Seismic Hazards Mapping Program. SHMA requires responsible agencies to only approve projects within seismic hazard zones following a site-specific investigation to determine if the hazard is present, and if so, the inclusion of appropriate mitigation(s). In addition, the SHMA requires real estate sellers and agents at the time of sale to disclose whether a property is within one of the designated seismic hazard zones.

B. Seismicity

Butte County is traversed by a large number of active and inactive faults, which have the potential to shift and result in earthquakes. Faults are areas of failure within the earth where materials on either side of the failure have moved relative to one another in response to the accumulation of stress. A number of major active faults are known within the wider Butte County region, including one within the county itself. While the Sierra foothills contain literally hundreds of mapped faults, dozens of which are located within Butte County, the vast majority of these faults are considered inactive.

As noted above, all of Butte County has been identified as a Seismic Hazard Zone by the Seismic Hazards Mapping Program of the California Geological Survey, with the entire county potentially subject to earthquakes of Modified Mercalli Intensity (MMI) scale VIII. Only one earthquake of this intensity, the Oroville earthquake of 1975, has been recorded in Butte County. In 1984, a study published by the California Geological Survey correlated this seismic activity with the filling and emptying of Lake Oroville. The study, titled Open File Report 84-25, concluded that other earthquakes of the same or greater intensities are unlikely in Butte County.

1. Active Faults

An active fault is defined by the California Geologic Survey as one which has had active surface displacement within Holocene time (i.e., over the past 11,000 years). Some faults are characterized as active based on surface displacements within historic time (over the last 200 years), while others are characterized as active based on surface displacements in rocks or sediments that occurred within the last 11,000 years. This definition of "active fault" does not mean that all faults for which there is no evidence of surface displacement during the Holocene are inactive. Some faults may have been active in this time period, but they did not result in changes to the surfaces that are easily identifiable. Meanwhile, other faults may still be active although they have not been active during the Holocene period. Many damaging California earthquakes, including the 1975 Oroville earthquake, the 1983 Coalinga earthquake, and the 1987 Whittier Narrows earthquake occurred on faults not previously recognized as active. Occasionally, earthquakes occur on blind thrust faults that are buried and show no evidence of past surface rupture, as was the case with the Northridge earthquake in 1994.

The sections below describe known active faults in Butte County and the wider region. These faults are mapped in Figure 17-10.

a. Active Faults within Butte County

As of 2018, there is only one identified active fault located within Butte County, the Cleveland Hills fault, identified pursuant to the Alquist-Priolo Act as an "earthquake fault zone." This fault was responsible for the 1975 Oroville earthquake, which had a Richter magnitude of 5.7, and was an event that produced surface displacement along approximately 2.2 miles of the fault. Ground motions corresponding to Modified Mercalli Intensity VIII (see discussion in Section V, this chapter) were experienced at Gridley and Oroville, and significant structural damage occurred to unreinforced masonry buildings in Oroville.

Geologic studies indicate that the total length of the Cleveland Hills fault is probably 11 to 15 miles. The maximum credible earthquake on this fault is believed to be about magnitude 6.5 to 6.7. An event of this magnitude would cause substantially more damage than the 1975 event. Figure 17-10 shows the approximate location of the Cleveland Hills fault; the official map of the State Geologist for the Cleveland Hills "earthquake fault zone" may be consulted at the Butte County Development Services Department.

b. Other Active Faults

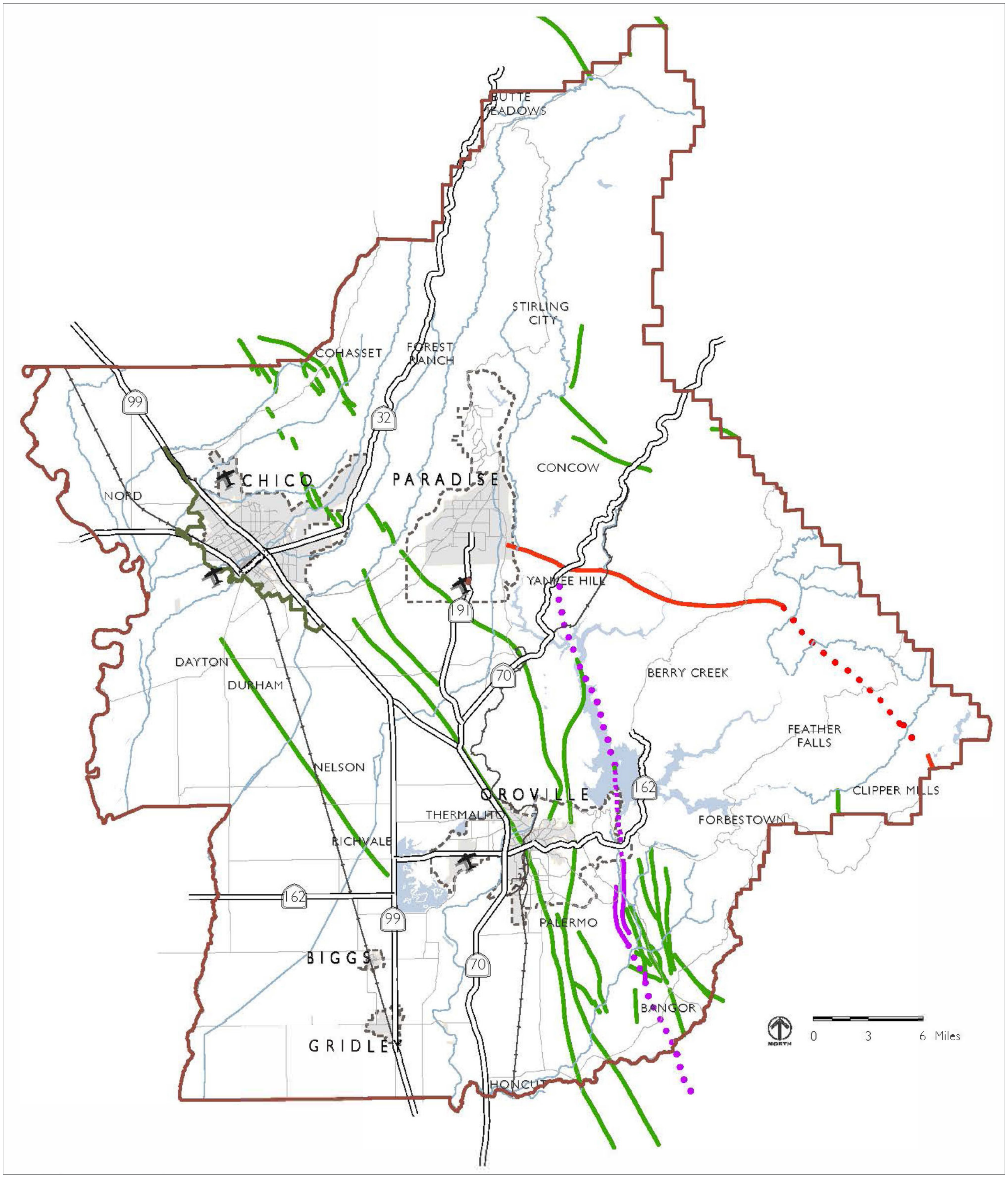
There are several known active faults located outside of Butte County that have the potential to cause seismic events that could be felt within the county.

i. San Andreas Fault System

The San Andreas Fault, along with related faults such as the Hayward and Calaveras faults, is one of the most active faults in California. Total displacement along this fault has been at least 450 miles and could possibly be as much as 750 miles. This fault system was responsible for the magnitude 8.0 San Francisco Earthquake of 1906 as well as numerous other damaging earthquakes, including the 1989 Loma Prieta earthquake. At its nearest point, the San Andreas Fault is about 95 miles west of Butte County. The 1906 earthquake was strongly felt in Butte County, at approximately MMI V and VI, but there was little damage.

ii. Midland-Sweitzer Fault

The 80-mile-long Midland-Sweitzer fault is located approximately 40 miles southwest of Butte County. Historically, earthquakes of Richter magnitudes between 6.0 and 6.9 have occurred on or near this fault, including two strong earthquakes in 1892. Based on the fault length and the historic activity, this fault is capable of producing a maximum credible earthquake (MCE) of magnitude 7 which would be experienced in Butte County with MMI as high as VIII or IX.



Source: Butte County General Plan 2030: Health and Safety Element, 2016.

Cleveland Hills Fault, Active
Cleveland Hills Fault, Concealed
Cleveland Hills Fault, Inferred
Big Bend Fault, Potentially Active
Big Bend Fault, Inactive
Unnamed Fault, Inactive
Airports
Greenline
Highways
Railroad
Major Roads
Sphere of Influence
City/Town Limits
County Boundary

Figure 17-10
Fault Lines

iii. Eastern Sierra Faults

The eastern Sierra contains a number of active faults including the Russell Valley fault, which produced the 1966 Truckee earthquake of magnitude 6 (approximately), and several faults in the Last Chance and Honey Lake fault zones, which have produced several magnitude 5 to 5.9 earthquakes. These fault zones are approximately 50 miles east of Butte County. Earthquakes on these faults could be experienced in Butte County with MMIs as high as VII or VIII.

c. Potentially Active Faults

There are a number of faults within Butte County and a large number of relatively nearby faults that could be considered potentially active. The California Geologic Survey has defined potentially active faults as those for which there is evidence of surface displacement within the Quaternary period; that is, within the last 1.6 million years., approximately. Faults classified as potentially active show no evidence of surface displacements within the past 11,000 years, but this period of time is short in geologic terms and thus such faults are considered potentially active. Figure 17-10 shows these potentially active faults based on 1977 data from the California Geological Survey.

Some geologists consider the Big Bend fault zone to be potentially active. This fault could produce an MCE of Magnitude 7 with a Modified Mercalli Intensity of IX or X in Butte County. Intensities this high would result in major damage. The Foothills Shear Zone extends into southern Butte County. A potential quake of magnitude 7.0 in this zone would result in intensities as high as IX in Butte County.

The Chico Monocline fault, which extends northwest from Chico, was considered potentially active in an unpublished 1988 report by the California Division of Mines and Geology (now the California Geological Survey). Based on its length, this fault could produce an MCE of at least magnitude 7, which would cause major damage in Chico and elsewhere in Butte County. South of Butte County is a series of small faults around the Sutter Buttes and an 18-mile long fault near Dunnigan. Earthquakes on these faults would produce only moderate ground motion in Butte County, probably not exceeding Modified Mercalli Intensity VI, with little or no damage.

West of Butte County is the 40-mile-long Willows fault, which could produce a magnitude 7 earthquake and could yield a Modified Mercalli intensity as high as VIII in Butte County (comparable to the intensity experienced during the 1975 Oroville earthquake).

The Coast Ranges Thrust Zone is approximately 35 miles west of Butte County. This fault zone could potentially produce an MCE of magnitude 8, which could be experienced in Butte County as Modified Mercalli Intensity IX or X. An event of this magnitude would cause major damage to Butte County.

East and southeast of Butte County there are numerous faults in the Sierra Foothills, including the Foothills Shear Zone (which extends into Butte County), the Camel's Peak fault, the Hawkins Valley fault, the Melones-Dogwood Peak fault system, the Bear Mountain fault, and many others. Potential activity on these faults cannot be excluded from consideration, although geologists disagree on how active or inactive these faults are.

It is important to note that faults that do not meet the California Geologic Survey's criteria are not necessarily permanently inactive. It is also important to recognize that seismic risk is not limited to faults that have been identified or mapped. A significant fraction of small to moderately large earthquakes occur on faults that were not previously recognized. Such earthquakes are characterized as "background seismicity" or "floating earthquakes," terms that indicate that the expected sources and locations of such earthquakes are often unknown. Based on this concept, the general geologic setting of Butte County and earthquake experience elsewhere in the Sierra foothills and Central Valley, it appears reasonable to assume that background seismicity could produce earthquakes as large as Richter magnitude 6.0 virtually anywhere in Butte County. Such earthquakes are considered capable of producing at least moderate damage.

After the 1975 Oroville earthquake, geologists also reevaluated the earthquake hazard in the Sierra foothills region, including Butte County. It is now generally accepted that earthquakes of magnitude 6.0 or 6.5 are possible anywhere in the foothills and near the margins of the Sacramento Valley, including Butte County. Opinions differ on the possibility of larger earthquakes of magnitude 7.0 or higher. The possibility of such earthquakes along the Chico Monocline fault, in the Coast Ranges thrust zone and along several faults in the Sierra foothills cannot be excluded from consideration. Earthquakes as large as magnitude 7.0 in these areas would produce major damage in Butte County. Such events would probably result in MMIs of IX or X in Butte County and could result in collapses of unreinforced masonry buildings, with substantial numbers of casualties.

C. Effects of Earthquakes

1. Ground Shaking

Ground shaking is motion that occurs as a result of energy released during faulting and is the most dangerous effect of earthquakes. Damage to structures from the ground vibrations is determined by physical characteristics of rock and soil, building materials, earthquake magnitude and distance from epicenter, and character and duration of the ground motion.

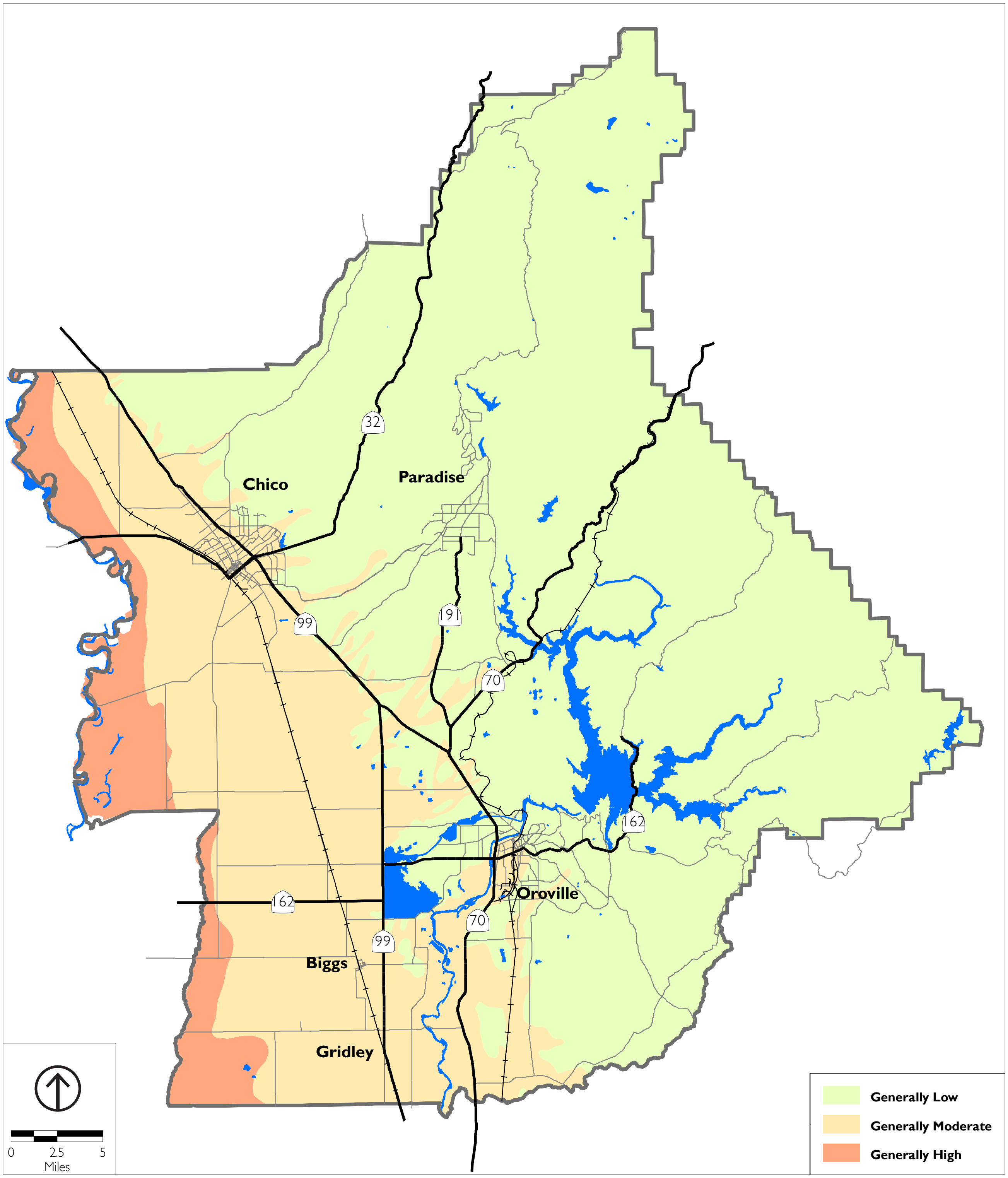
Based on the known active faults and on the large number of potentially active faults, all parts of Butte County are potentially subject to moderately strong ground shaking (peak ground accelerations from 10 percent to 20 percent gravity). The intensity of ground shaking at any specific site depends on the characteristics of the earthquake, the distance from the earthquake, and on the local geologic and soil conditions. Conservatively, ground motions as strong as those observed in Oroville during the 1975 earthquake (Modified Mercalli Intensity VIII) can be expected anywhere in Butte County. More conservatively, ground motions with Intensities as high as X (10) could occur from magnitude 7 earthquakes on the Chico Monocline Fault, the Big Bend Fault, or the Foothills Shear zone. Similar intensities could be experienced in Butte County from larger earthquakes on more distant faults such as the Coast Ranges thrust zone or Melones fault zone.

2. Liquefaction Potential

Liquefaction, which may occur from strong ground shaking during earthquakes, is the transformation of a granular sediment or fill material from a solid state to a temporarily liquid state. Liquefaction is a serious hazard because buildings in areas that experience liquefaction may sink or suffer major structural damage. Liquefaction occurs in saturated soils when pore pressure exceeds the natural frictional strength between grains. This is most common in loose soils with no cohesion. As a result, the soil loses strength and starts to flow. Liquefaction is most often triggered by seismic shaking, but can also be due to improper grading, landslides, or other factors. In dry soils, seismic shaking may cause soil to settle rather than flow, a process known as densification.

Of particular concern are areas paralleling the Sacramento River that contain clean sand layers with low relative densities which are estimated to have generally high liquefaction potential. Granular layers underlying most of the remaining Sacramento Valley area of Butte County have higher relative densities and thus have moderate liquefaction potential. Clean layers of granular materials older than Holocene are of higher relative densities and are thus of low liquefaction potential.

Areas of bedrock, including most of eastern Butte County, have no liquefaction potential, although localized areas of valley fill alluvium can have moderate to high liquefaction potential. Figure 17-11 shows areas of liquefaction potential in Butte County.



Sources: PlaceWorks, Butte County General Plan 2030 Setting & Trends Report, 2007.

Figure 17-11
Liquefaction Zones

3. Seiches

A seiche is a periodic oscillation of a body of water such as a reservoir, river, lake, harbor, or bay resulting from seismic shaking or other causes such as landslides into a body of water. The period of the oscillation varies depending on the size of the body of water and may be several minutes to several hours. Depending on the magnitude of the oscillations, seiches can cause considerable damage to dams, levees, and shoreline facilities. Seiches have not been recorded in any of the reservoirs in Butte County that are within the jurisdiction of the California Division of Dam Safety. However, the potential for seiches does exist in Butte County, either from landslides or from stronger earthquakes that have been experienced in historical times.

4. Landslides

The general potential for landslides in Butte County is discussed in the Geologic Hazards section of this document, which can be found in Section D, below. Earthquakes may initiate landslides, particularly during the wet season, in areas of high ground water or saturated soils. The most likely areas for earthquake-induced landslides are the same areas of high landslide potential discussed in the Geologic Hazards section.

5. Dam Safety

Earthquakes can endanger dams in several ways, including failure of the foundations or the dams themselves due to ground failures or through secondary effects such as seiches and landslides in the reservoir. Dam safety, including seismic safety, is discussed in Section IV.D.

6. Structural Damage or Collapse

The earthquake performance of structures varies considerably due to a number of factors. These include their location across active faults or in poor ground areas (e.g., landslide and liquefaction), type of construction (e.g., wood frame, unreinforced masonry, and nonductile concrete frame), magnitude and intensity of the earthquake and duration of strong ground shaking, distance from the causative faults, and similar factors. In recent history, Butte County has experienced two damaging earthquakes (1940 and 1975). Unreinforced masonry buildings in the older sections of Chico (1940) and Oroville (1975) suffered moderate to severe damage in these earthquakes.

In general, evidence from past earthquakes shows that wood frame structures properly tied to their foundations perform very well or, if badly damaged, cause few injuries and life loss even if located in areas of poor ground quality. Older wood frame structures that have stone, brick, or cripple wall foundations, or that are not bolted to their foundations, do not perform well. Un-reinforced masonry structures, on the other hand, perform poorly under almost all earthquake conditions, especially if located on poor ground areas. Nearby relatively small earthquakes can be very damaging because of the sharp motions they generate. Distant events, while more damaging to taller buildings, can also damage un-reinforced masonry buildings because of the stresses caused by long-period motions. Mobile homes generally perform very well because of their lightness, but failures of their weak foundation supports (usually flimsy metal stands or concrete blocks) can produce serious damage and economic losses. Older mobile homes are also considered serious fire hazards because of the non-fire-resistant wall paneling and other materials. The performance of other structures depends on their specific characteristics, quality of construction, and other factors discussed above.

D. Geologic Hazard Analysis

This section describes other geologic hazards in Butte County. These hazards are associated with a variety of factors, including soils types and conditions, topography or slope, and the action of water or wind. Many of these hazards are related to, or can be exacerbated by seismic factors, such as ground movement associated with earthquake activity, as described above.

1. Erosion

Erosion is a two-step process by which soils and rocks are broken down or fragmented and then carried away. Rocks can rub against each other, fall apart, or be exposed to weather, but water causes most erosion. Wind may also be an important erosion agent. The rate of erosion depends on many variables including the soil or rock texture and composition, the permeability of the soil, the slope, the extent of vegetative cover, and precipitation amounts and patterns. Aside from natural causes of erosion there are anthropogenic agents which can aid in the reduction of parent material as well; in Butte County this includes mining, logging, and cattle ranching.

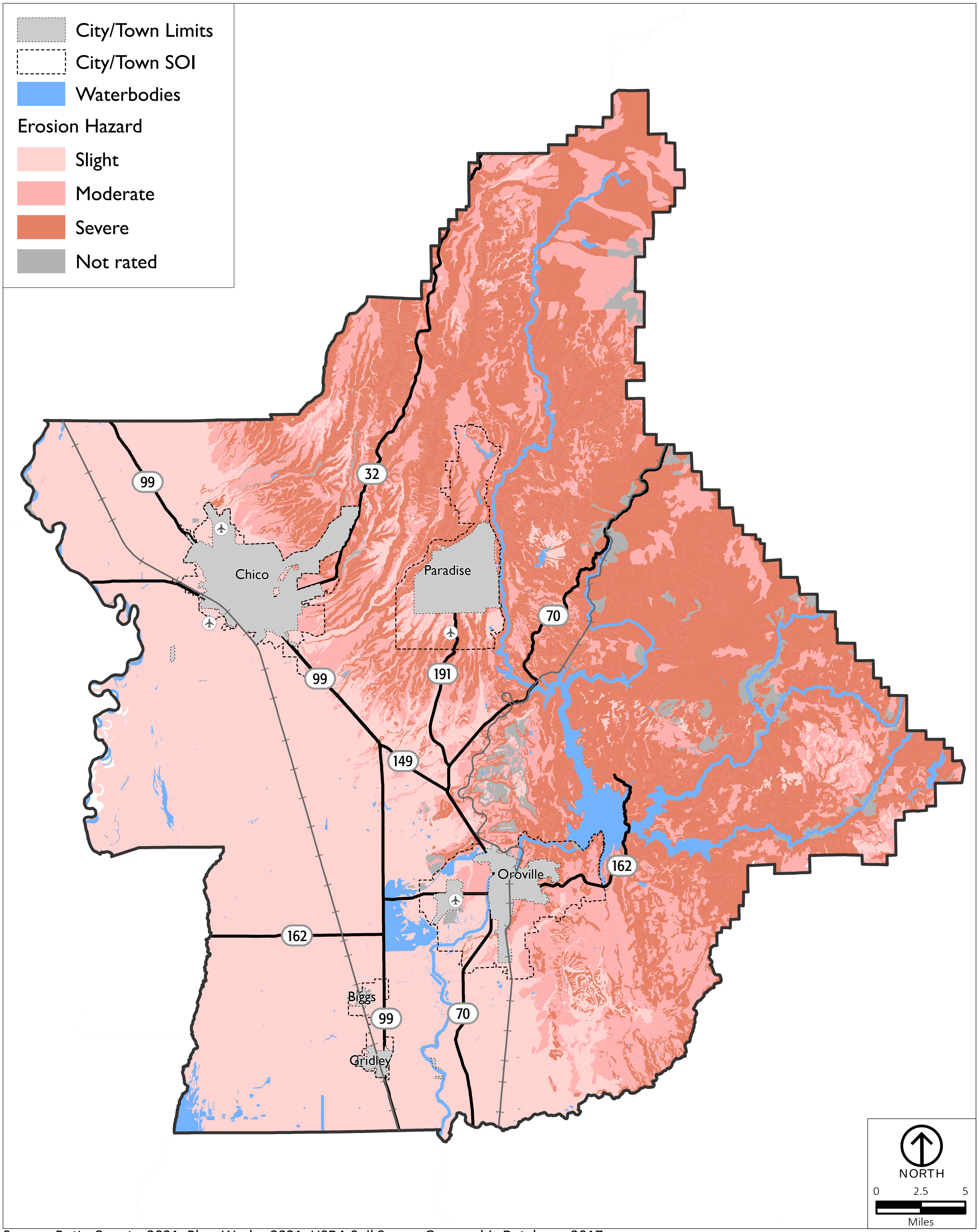
Erosion increases with increasing slope, increasing precipitation, and decreasing vegetative cover. Erosion may be extremely high in areas where protective vegetation has been removed by fire, construction, or cultivation. High rates of erosion may have several negative impacts including degradation and loss of agricultural land, degradation of streams and other water habitats, and rapid silting of reservoirs. Instability of slopes due to erosion can be a major safety hazard and thus these issues must be addressed when development or activity occurs in areas of high erosion potential.

Erosion hazard potential in Butte County is shown in Figure 17-12. This figure shows the degree of erosion that may be expected when protective vegetation is removed, as well as the level of erosion hazard according to underlying geology and rainfall.

2. Streambank Stability

Among the various hazards associated with the geologic setting of Butte County is the issue of streambank stability. A streambank may be considered unstable if the slopes surrounding the stream are excessively steep and present a potential landslide hazard, or if erosion is occurring at a relatively high rate. A natural riverine system functions in a state of "dynamic equilibrium" in which erosion and deposition is constantly taking place. Through this cycle, the areas surrounding the stream can become unstable, thus leading to potential for geologic hazards. Other issues associated with streambank stability involve human activity and development. Cattle ranching, logging, mining, and agriculture are some of the major anthropogenic effects that cause disequilibrium in the streams and rivers of Butte County.

Over the past few decades, regulatory measures have been taken to mitigate these effects. Ranchers are encouraged to retain water on their land to prevent excessive hoof traffic along the streambanks. Environmental impact regulations have become more stringent with regards to logging and mining in an effort to reduce near-channel and in-channel disruption. Seismic ground shaking also poses a threat to streambank stability, especially in areas where surrounding slopes are steep or where there is a large standing body of water below (see the discussion of seiches in the dam safety section above). Streambank stability issues present a potential for hazards along the rivers in the valley region of Butte County where erosion is concerned.



Source: Butte County, 2021; PlaceWorks, 2021; USDA Soil Survey Geographic Database, 2017.

FIGURE 17-12

EROSION HAZARD POTENTIAL

3. Subsidence

Subsidence is the sinking of a large area of ground surface in which the material is displaced vertically downward, with little or no horizontal movement. The California Department of Water Resources installed two devices called extensometers for measuring subsidence around the valley region of the county, in 1989 and three more in 2003.[34] Extensometers are metal rods fixed into a deep well. A gauge on the rod measures how much the soil declines at the edges of the well. Thus far, results indicate no major subsidence in the wells tested in the area.

Subsidence, usually as a direct result of groundwater withdrawal or oil and gas extraction, is common in several areas of California, including parts of the Sacramento Valley and in large areas of the San Joaquin Valley. Subsidence is a greater hazard in areas where the subsurface geology includes compressible layers of silt and clay. Subsidence due to ground-water withdrawal generally affects larger areas and presents a more serious hazard than does subsidence due to oil and gas withdrawal. Nonetheless, localized subsidence due to oil and gas withdrawal has been observed at numerous locations in California, primarily in the Los Angeles basin. In portions of the San Joaquin Valley, subsidence has exceeded 30 feet over the past 50 years. In the Sacramento Valley, preliminary studies suggest that much smaller levels of subsidence, ranging from six inches to two feet, may have occurred. In most of the valley, elevation data are inadequate to determine positively if subsidence has occurred. However, groundwater pumping in the Sacramento Valley has been increasing and groundwater levels have declined in some areas, leading to an increased likelihood that subsidence has, or will become a more significant issue.

The amount of subsidence caused by groundwater withdrawal depends on several factors, including the extent of water level decline; the thickness of the water-bearing strata tapped; the thickness and compressibility of silt-clay layers within the vertical sections where groundwater withdrawal occurs; the duration of maintained ground water level decline; the number and magnitude of water withdrawals in a given area; and the general geology and geologic structure of the groundwater basin. The damaging effects of subsidence include gradient changes in roads, streams, canals, drains, sewers, and dikes. Many such systems are constructed with slight gradients and may be significantly damaged by even small elevation changes. Other damaging effects include damage to water wells resulting from sediment compaction and increased likelihood of flooding of low-lying areas.

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[34] http://ucce.ucdavis.edu/files/filelibrary/2280/26945.pdf, accessed on April 25, 2007.

Land subsidence is considered to be a potential hazard for the portions of Butte County located within the Sacramento Valley. Areas of potentially significant subsidence are shown in Figure 17-13. The greatest potential subsidence areas are where heavy groundwater withdrawal is occurring and in gas-producing areas. According to investigations by the U.S. Geological Survey, the areas of heaviest groundwater withdrawal extend about two miles north and south of Chico and in a one-mile radius around Gridley. The amount of subsidence that could take place in the county depends primarily on the amount of groundwater withdrawal. The possibility of subsidence resulting from large groundwater draw-downs during prolonged droughts is a serious concern.

4. Landslides

Landslides are downward and outward movements of slope-forming materials which may be rock, soil, artificial fill, or combinations of such materials. The size of landslides varies enormously, from tiny slides containing less than a cubic yard of material to massive slides containing millions of cubic yards. Large landslides may move downslope for hundreds of yards, or even several miles. A landslide may move rapidly as in a soil or rock avalanche or it may move slowly for hours or even weeks. A similar but much slower movement is called creep.

The susceptibility of a given area to landslides depends on many variables. However, the general characteristics that influence landslide hazards are well understood and thus it is possible to map areas in terms of general susceptibility to landslides. There are a number of important factors that govern the formation of landslides, including:

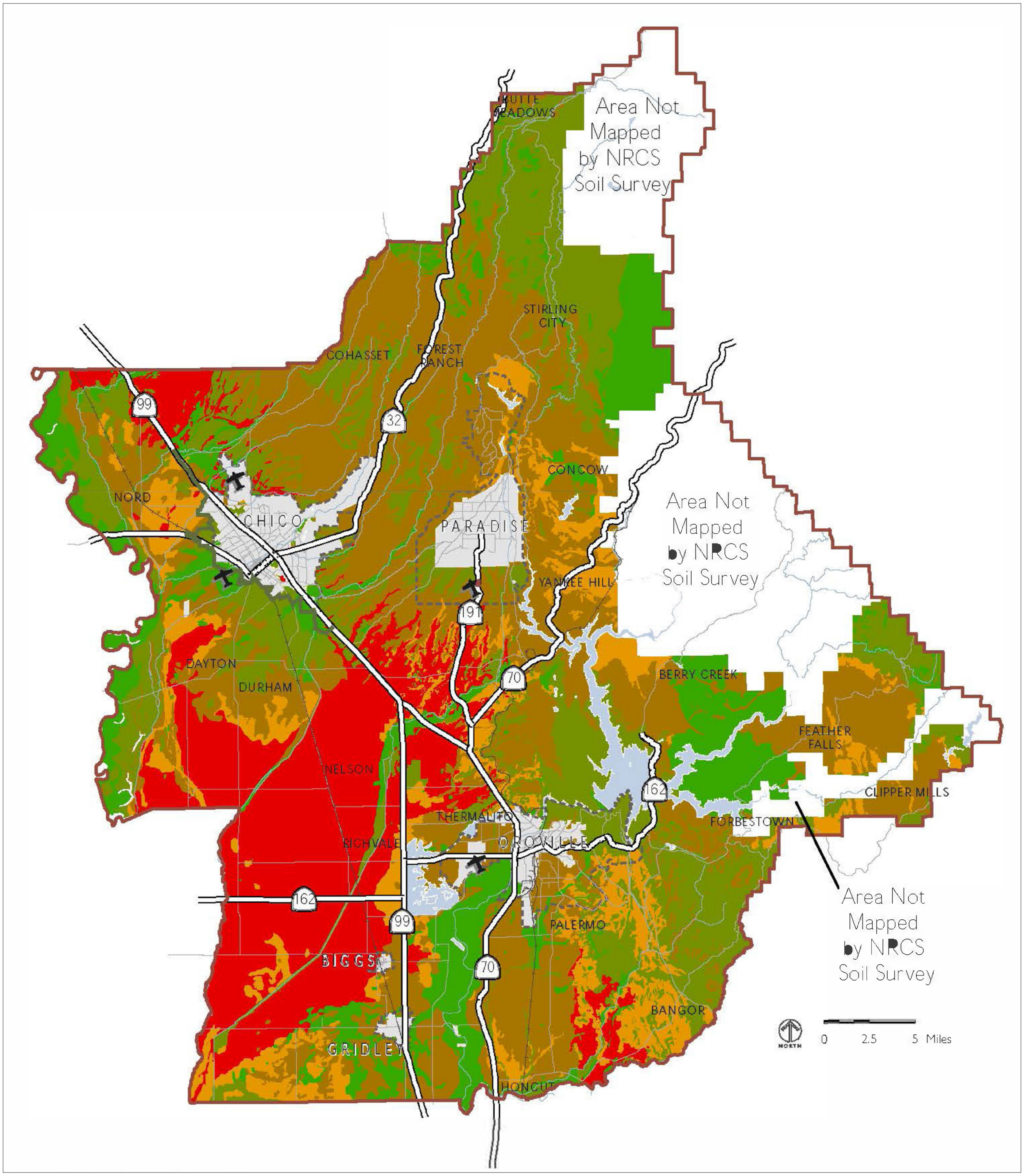
- Slope Steepness: Most landslides occur on moderate to steep slopes.
- Slope Material: Loose, unconsolidated soils and soft, weak rocks are more hazardous than are firm, consolidated soils or hard bedrock.
- Structure and Physical Properties of Materials, including the orientation of layering and zones of weakness relative to slope direction.
- Water Content: Increased water content increases landslide hazard, by decreasing resistance to sliding and adding weight to the materials on a slope.
- Vegetation Coverage: Abundant vegetation with deep roots increases slope stability.
- Proximity to Areas of Erosion or Man-made Cuts: Undercutting slopes may greatly increase landslide potential.

- Earthquake Ground Motions: Strong ground motion may trigger landslides in marginally stable slopes or loosen slope materials and thus increase the risk of future landslides.

Landslides do occur in Butte County, but they are not common. Because of differences in the physical characteristics of slope materials, which markedly influence landslide potential, some superficially similar areas may differ strongly in terms of landslide hazards. For this reason, a site-specific geotechnical analysis would be needed to accurately assess potential landslide hazards at any specific project location.

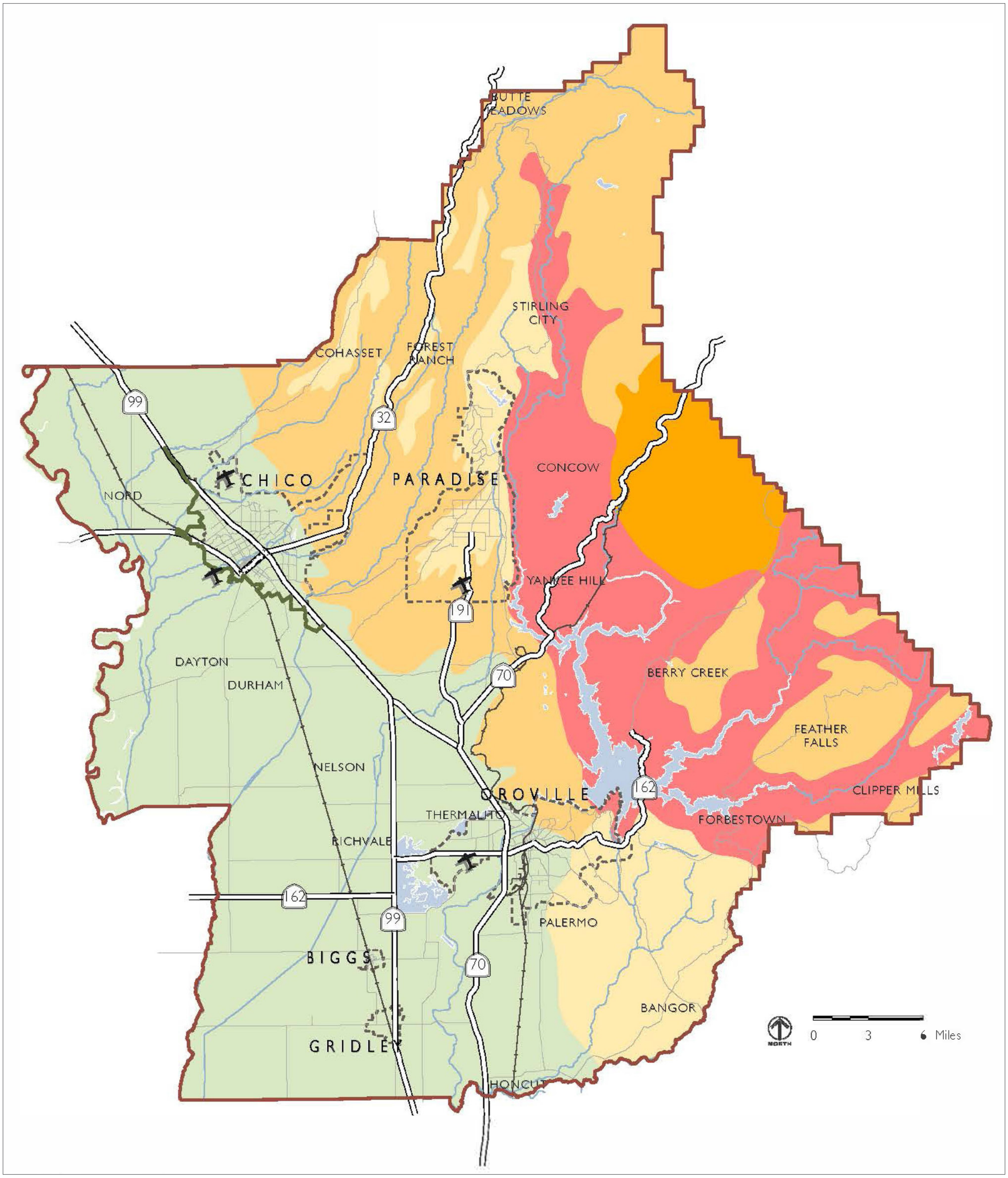
Most landslides in Butte County occur on slopes greater than 15 percent, and most new landslides occur in areas that have experienced previous landslides. The areas of highest landslide potential are in the mountainous central and northern areas of the county where well-developed soils overlay impervious bedrock on steep slopes, which at times undergo heavy rainfall. The slopes around flat uplands, such as Table Mountain, are also highly susceptible to landslides. The rest of Butte County has moderate to low landslide potential. The areas of lowest landslide potential are the flatlands of the Sacramento Valley. There may, however, be some landslide hazard due to possible liquefaction of soils bordering the Sacramento River and its tributaries. Areas with potential landslide hazards are shown in Figure 17-14.

Climate change will likely increase landslides within the county as precipitation falls in more intense rainstorms, droughts dry out vegetation, and wildfires remove stabilizing vegetation from the mountains and hillsides. Wildfires and droughts can clear vegetation that holds soil in place and dry out soil to the point that it is less able to absorb water, creating a risk of landslides when heavy rains return. This can cause landslides and debris flows, especially in areas within or below burn scars.



Sources: PlaceWorks, Butte County General Plan 2030 Setting & Trends Report, 2007.

Figure 17-13
Subsidence Areas



Source: Butte County General Plan 2030: Health and Safety Element, 2016.

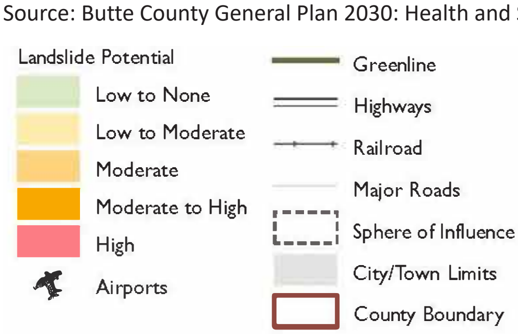
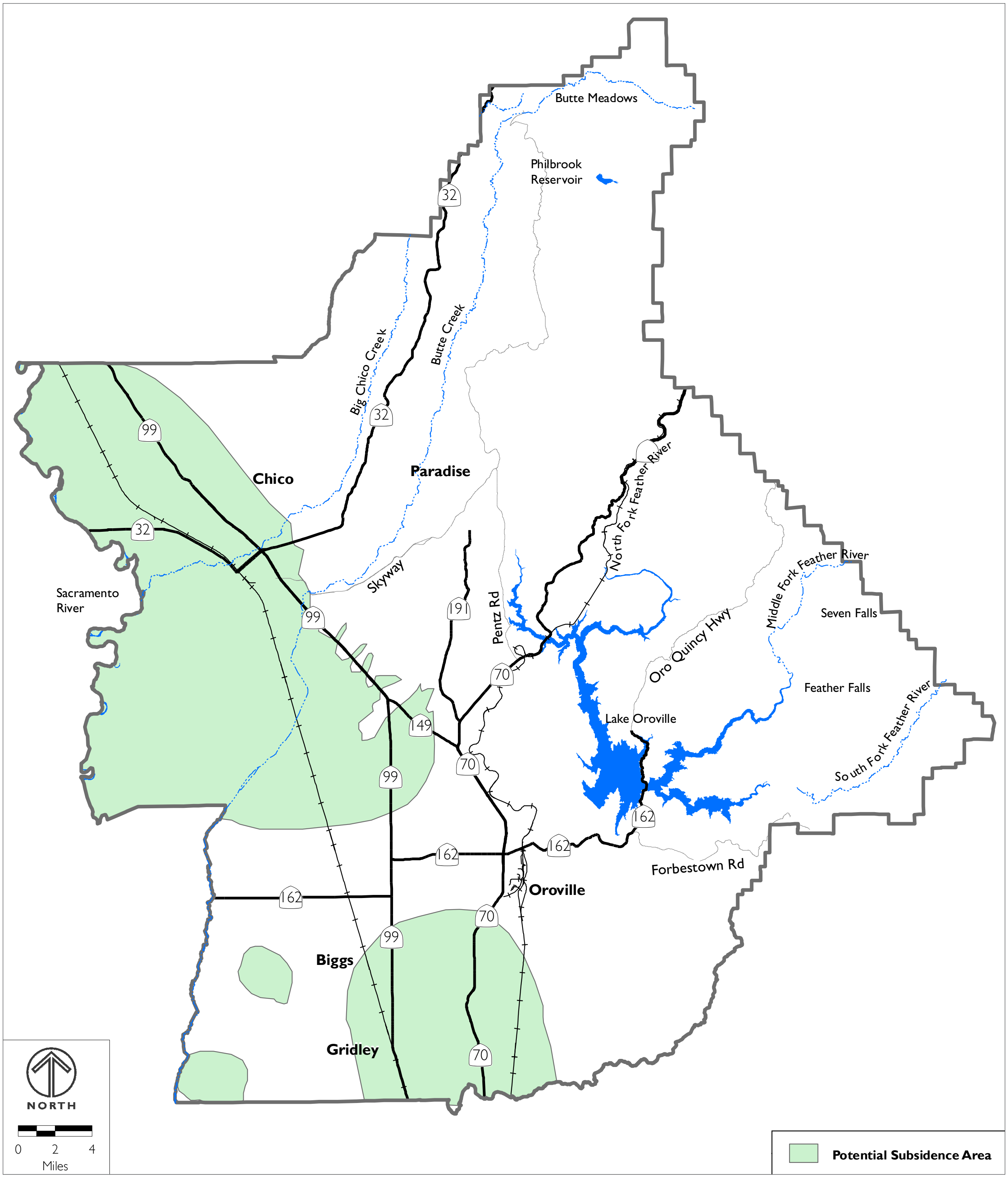


Figure 17-14
Landslide



Source: Butte County General Plan 2030: Health and Safety Element, 2016.

Figure 17-15

Expansive Soils

5. Expansive Soils

Expansive soils have a potential to undergo significant changes in volume, either shrinking or swelling, with changes in moisture content. Periodic shrinking and swelling of expansive soils can cause extensive damage to buildings, other structures, and roads. Moisture content and the percentage and type of clay minerals present in the soil determine the potential volume change of an expansive soil. Soils composed only of sand and gravel have no potential for volume change due to moisture change. Soils containing clays have variable potential for volume changes. Such soils are generally classified into three expansive soils classes with low, moderate, and high potential for volume changes:

- Low: This soils class includes sands and silts with relatively low amounts of clay minerals. Sandy clays may also have low expansion potential, if the clay is kaolinite (a common group of clays).
- Moderate: This class includes silty clay and clay textured soils if the clay is kaolinitic and also includes heavy silts, light sandy clays, and silty clays with mixed clay minerals.
- High: This class includes clays and clay with mixed monmorillonite, a clay mineral that expands and contracts more than kaolinite.

Technically, expansive soils are classified on a numerical shrink-swell classification index that varies from zero (no potential volume changes) to 10 (maximum potential volume changes). In this classification, soils with a shrinkage index below five are considered to have low expansion potential. Soils with an index between five and seven have moderate expansion potential, and soils with indices above seven have high expensive potential.

Figure 17-15 shows the distribution of expansive soils within Butte County. Note that soils with no expansive potential are grouped in the low expansion potential category. Soils with no or low expansion potential occur along stream and river valleys and on steep mountain slopes. Soils of high expansion potential generally occur in the level areas of the Sacramento Valley, including around the population centers of Chico, Oroville, Biggs, and Gridley.

6. Volcanic Hazards

Some of the most striking topographic features of Butte County, including Table Mountain north of Oroville, are volcanic in origin. The lava flows that now cap Table Mountain and most of the other volcanic features in the county are the result of ancient volcanic activity, occurring tens of millions of years ago. The geologic activity producing this volcanism has long since ceased and thus there are virtually no volcanic hazards within most of Butte County. However, extreme northern Butte County is an exception to this generalization because Mt. Lassen, an active volcano, is only about 25 miles north of the Butte County line. Mount Lassen is the southernmost volcano in the Cascade Range. There are numerous active volcanoes in the Cascades, including Mount Shasta in California and several others in Oregon and Washington. Mount Lassen last erupted in the period between 1914 and 1921; this period of volcanic activity included steam and ash eruptions as well as a small lava flow. Like the other volcanoes in the Cascades, Mount Lassen is considered dormant, which means that it is not currently erupting but is expected to erupt again in the future. Mount Lassen has erupted at least seven times within the past 1,200 years.

There are four main hazards that may accompany volcanic eruptions: ash and cinder falls, explosive blasts, lava flows, and mud flows. Despite the general severity of volcanic hazards, actual volcanic hazards for Butte County are limited to the northernmost portions of the county that might be affected by an eruption by Mount Lassen. Even here, the hazards are relatively modest because of the distance between Butte County and Mount Lassen. In historic times, there are no records of significant ash falls, explosive effects, lava flows or mud flows from Mount Lassen reaching Butte County. Furthermore, impending volcanic eruptions are generally signaled by numerous advanced warning signs, and thus it is usually possible to evacuate residents in areas subject to volcanic hazards, particularly given the county's distance from the volcanic event. Although the potential for volcanic hazards in Butte County is low, consideration of these hazards should nonetheless be made for the northern reaches of the county. Ash fallout and pyroclastic ejecta may cause damage to structures, inhibit operation of vehicles and machinery, and create public health and safety concerns.

7. Naturally Occurring Asbestos

Within California, naturally occurring asbestos (NOA) is known to exist in serpentine rock. This rock, and its parent material, ultramafic rock, is abundant in the Sierra foothills, the Klamath Mountains, and Coast Ranges. Within Butte County, serpentine rock is found within the foothill and mountain regions. NOA is commonly found in ultramafic rock, including serpentine, and near fault zones. The amount of asbestos that is typically present in these rocks ranges from less than 1 percent up to 25 percent and more. Asbestos is released from ultramafic and serpentine rock when it is eroded, broken, or crushed. This can happen when cars drive over unpaved roads or driveways which are surfaced with these rocks, when land is graded for building purposes, or at quarrying operations. Asbestos is also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time.

The primary hazard is from chronic inhalation into the lungs. Asbestos is a known carcinogen and inhalation of asbestos may result in the development of lung cancer or mesothelioma. The asbestos contents of many manufactured products have been regulated in the U.S. for a number of years. CARB has regulated the amount of asbestos in crushed serpentine used in surfacing applications, such as for gravel on unpaved roads, since 1990. In 1998, new concerns were raised about possible health hazards from activities that disturb rocks and soil containing asbestos and may result in the generation of asbestos-laden dust (Asbestos Airborne Toxic Control Measure AATCM, 2000). These concerns led CARB to revise their asbestos limit for crushed serpentinite and ultramafic rock in surfacing applications from 5 percent to less than 0.25 percent, and to adopt a new rule requiring best practices dust control measures for activities that disturb rock and soil containing naturally occurring asbestos.

Serpentine soils are an important natural resource in Butte County. Over 200 species of native California flora are restricted wholly or in large part to serpentine soils, and an estimated 90 to 100 taxa are endemic to serpentine and related soil types in the northern coast ranges of California. Serpentine soils or rock should be left undisturbed and stabilized to reduce exposing or releasing asbestos fibers into the environment. As long as fibers remain bound in rock or soil, they pose very little health threat.

VI. CLIMATE CHANGE HAZARDS

Climate change is likely to increase the frequency and intensity of existing hazards and cause new hazards to occur within Butte County. This section describes the regulatory setting for addressing climate change and resilience in California, primary climate stressors in Butte County, and secondary climate stressors, or hazards, that are likely to occur. Some climate change hazards, including wildfire, flooding, and landslides, are described in previous sections of this chapter.

A. Regulatory Setting

In 2015, the State adopted Senate Bill 379, amending Section 65302(g) of the California Government Code to require safety elements of general plans to include more information about wildfire hazards, flooding risks, and other short-term and long-term threats posed by climate change. Senate Bill 379 is the foundation of adaptation and resiliency in general plan safety elements, as it requires local governments to conduct vulnerability assessments as part of their long-range public safety planning efforts and to prepare policies that will protect against harm caused by climate change.

Another important update to the California Government Code related to safety elements, climate change, and resiliency is Senate Bill 1035. This law, which amended Section 65302(g)(3) of the California Government Code, builds on previous legislation and requires local governments to review and update as needed their safety element during an update to their housing element or HMP (or no less than every eight years). Any revisions should include updated information related to flood hazards, fire hazards, and climate adaptation and resilience.

The County completed a Draft Climate Change Vulnerability Assessment in 2018 that includes an analysis of hazards such as increased temperatures, extreme heat, changes in precipitation patterns, snowpack loss, and increased wildfires. This assessment followed guidance provided in the California Adaptation Planning Guide, including an analysis of impact and adaptive capacity.

B. Primary Climate Stressors

Climate stressors are conditions or trends related to climate variability, temperature change, and precipitation shifts that can exacerbate hazards.[35] Primary climate stressors in Butte County include increased temperatures and changes in precipitation.

1. Increased Temperatures

As climate change intensifies, global temperatures are expected to continue to rise. At the local level in Butte County, this means a gradual increase in annual average temperatures. Historically, the annual average temperature in Butte County is 71

[35] U.S. Climate Resilience Toolkit, 2015, https://toolkit.climate.gov/content/glossary#ClimateStressor, accessed February 23, 2021.

degrees Fahrenheit, with temperatures highest in the valley regions and lowest in the high elevations.[36] The county-wide average high temperature is expected to increase to 76.6 degrees Fahrenheit by 2050 and 80.1 degrees Fahrenheit by 2100.[37] Increased annual average temperatures can cause more precipitation to fall as rain instead of snow, and snow to melt earlier in the year, reducing overall levels of snowpack that are essential to supplying a reliable source of water throughout the year. Other secondary effects include an increase in the number of extreme heat days; increased water demands for agriculture, residential, and ecosystem uses; increase in pests and disease activity for both ecosystems and humans; and increased wildfire conditions as hotter conditions dry out fuel more quickly.

2. Changes in Precipitation

While precipitation is projected to increase in Butte County, precipitation patterns are likely to shift, causing more rain to fall in fewer storms throughout the year.[38] Historically, Butte County received an annual average of approximately 42.3 inches of rain per year, with lower levels in the valley and higher levels at higher elevations.[39] This is expected to increase to an annual average of 46.7 inches by 2050 and an annual average of 50.8 inches by 2100.[40] Increased precipitation over a shorter period of time can lead to flooding in downstream areas, increased erosion along rivers and creeks, and landslides and debris flows on mountain and hillsides. On the opposite side, changes in precipitation patterns could lead to an increase in droughts, which would reduce water supplies and harm several economic sectors in the county.

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[36] California Energy Commission. 2018. “Annual Average Maximum Temperature”. https://cal-adapt.org/tools/annual-averages/, accessed February 23, 2021.

[37] California Energy Commission. 2018. “Annual Average Maximum Temperature, RCP 8.5”. https://cal-adapt.org/tools/annual-averages/, accessed February 23, 2021.

[38] Houlton, Benjamin, Jay Lund. (University of California, Davis). 2018. Sacramento Summary Report. California’s Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-002.

[39] California Energy Commission. 2018. “Annual Average Precipitation”. https://cal-adapt.org/tools/annual-averages/, accessed February 23, 2021.

[40] California Energy Commission. 2018. “Annual Average Precipitation, RCP 8.5”. https://cal-adapt.org/tools/annual-averages/, accessed February 23, 2021.

C. Secondary Climate Stressors

Secondary climate stressors are considered hazards that are created or worsened by primary climate stressors. Wildfire, flooding, and landslides are three hazards described above in this chapter. Additional climate change hazards include extreme heat, drought, severe weather, agriculture and forestry pests and diseases, and human health hazards.

1. Extreme Heat

Extreme heat occurs when temperatures rise significantly above normal levels. "Extreme heat" is a relative term—temperatures of 100 degrees are normal in locations like Palm Springs, but almost unprecedented in higher mountain areas of eastern Butte County. Butte County has different extreme heat temperatures in different regions of the county. An extreme heat day is where temperatures reach 105.3 degrees in Richvale, 99.0 degrees in Berry Creek, and 95.1 degrees in Stirling City.[41] Although temperatures are lower in the mountain areas of the county, it is still dangerous when temperatures are higher than usual for people and assets that are not accustomed to them. Warm nights, when the daily minimum temperatures remain significantly above normal levels, can worsen an extreme heat day, because people and assets may not get relief from the high temperatures. A warm night is where temperatures remain above 70.6 degrees in Richvale, 65.2 degrees in Berry Creek, and 60.1 degrees in Stirling City.[42]

Historically, Butte County has experienced an average of five extreme heat days a year. Table 17-6 shows extreme heat day thresholds and projected changes in the number of extreme heat days per year throughout the county.

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[41] California Energy Commission. 2018. "Extreme Heat Days & Warm Nights RCP 8.5". https://cal-adapt.org/tools/extreme-heat/, accessed February 23, 2021.

[42] California Energy Commission. 2018. "Extreme Heat Days & Warm Nights RCP 8.5". https://cal-adapt.org/tools/extreme-heat/, accessed February 23, 2021.

TABLE 17-6 NUMBER OF PROJECTED EXTREME HEAT DAYS PER YEAR IN BUTTE COUNTY

Sub-Region	Extreme Heat Threshold (^{o}F)	Historic (1950-2005)	Mid-Century (2040-2070)	Late Century (2070-2099)
Butte County	100.1	5	34	59
Richvale	105.3	4	30	54
Berry Creek	99	5	34	60
Stirling City	95.1	5	32	58

Source: California Energy Commission. 2018. "Extreme Heat Days and Warm Nights." http://caladapt.org/tools/extreme-heat/.

Extreme heat can cause heat-related illnesses, such as heat cramps, heat exhaustion, and heat stroke. These temperatures can harm animals and plants that are not adapted to these conditions. Some types of infrastructure, including power lines and roadways, face greater stresses during high temperatures, which make materials unstable and failure more likely. Very high temperatures make people less likely to venture outside, hurting recreation and tourism economic sectors that depend on outdoor activities. Extreme heat can also increase wildfire conditions by drying out plant material, and prolonged high temperatures can contribute to drought conditions.

2. Drought

A drought occurs when conditions are drier than normal for a long period of time, making less water available for people (especially if local water supply depends on surface water), agricultural uses, and ecosystems. Communities in Butte County may experience water shortages during drought conditions, which could lead to mandatory water restrictions for both domestic and agricultural purposes. Farmers and ranchers may need to cut back on irrigation activities and homeowners may need to change water use behavior. Less precipitation could lower water levels or decrease water quality in streams and lakes, which can affect both natural habitats and recreation activities.

Droughts are a regular occurrence in California; in the past 50 years, there have been four major statewide droughts, plus smaller regional droughts.[43] Table 17-7 shows major California droughts in the past 50 years. Scientists expect that climate change will lead to more frequent and more intense droughts statewide. In Butte County, overall precipitation levels are expected to increase slightly, but there are expected to be more frequent years of extreme levels of precipitation, both high and low, as a result of climate change.[44] This is expected to cause more droughts that are more intense and last longer compared to historical norms.[45] Baseflow in rivers and creeks in Butte County are projected to decline significantly in early 21st century extended-drought scenarios.[46]

TABLE 17-7 HISTORIC DROUGHTS IN CALIFORNIA, 1970 TO 2019

Years	Major Effects of Droughts
1975-1977	Widespread water shortages and $2.67 billion in crop damages.
1987-1992	Extremely dry rangeland, irrigated agriculture with severe surface water shortages and falling groundwater levels, widespread rural areas where individual and community supplies were going dry, urban area water rationing at 25 to 50 percent of normal usage, and environmental impacts. California Drought Action Team established.
2007-2009	Water shortages, lack of irrigation supplies, social assistance programs required, water distribution systems.
2012-2017	Water shortages and restrictions, $6.6 billion in drought response and mitigation programs.

Source: Butte County, 2019, Local Hazard Mitigation Plan, Chapter 4: Risk Assessment.

43 California Governor's Office of Emergency Services. 2018. 2018 State of California Multi-Hazard Mitigation Plan. http://www.caloes.ca.gov/for-individuals-families/hazard-mitigation-planning/statehazard-mitigation-plan.

44 California Energy Commission. 2018. "Extended Drought Scenarios." https://cal-adapt.org/tools/extended-drought/, accessed February 23, 2021.

45 California's Governor's Office of Planning and Research (OPR), California Natural Resource Agency (CNRA), and California Energy Commission (CEC). 2018. "California's Fourth Climate Change Assessment." http://www.climateassessment.ca.gov/.

46 California Energy Commission. 2018. "Extended Drought Scenarios, Early 21st Century Drought". https://cal-adapt.org/tools/extended-drought/, accessed February 23, 2021.

3. Severe Weather

Severe storms include freeze and winter storms, strong winds, tornados, hail, lightning, and heavy rainfall. Severe weather is usually caused by intense storm systems, although types of strong winds can occur without a storm. The connection between climate change and severe storms is not as well established as other exposures, but new evidence suggests that severe storms may occur more often and become more intense than in the past as a result of climate change.[47] Extreme cold can occur throughout the county, but winter storms and snowfall are limited to in and above the Town of Paradise. Between 1993 and 2018, 179 severe winter storm events have occurred in Butte County, including blizzards, wind chill, frost/freeze, heavy snow, winter storms, and other winter weather.

Severe storm systems can also bring heavy rain, hail, and lightning to all parts of the County. From 1950 to 2018, there have been nine hail events, 19 heavy rain events, and three lightning events in the County. In 2020, there were additional lightning events that sparked multiple wildfires in the county. Hail can damage buildings and plants (and in extreme cases injure people), and lightning can spark fires, injure people, or cause fatalities. Heavy rainfall, which is characterized by rainfall amounts that exceed normal levels, can lead to flooding along the creeks and ravines in the mountain communities in eastern Butte County.[48]

Severe winds are sustained winds of 40 miles per hour or greater lasting for one hour or longer, or wind gusts of 58 miles per hour.[49] Wind speeds can reach over to 100 miles per hour in some areas of Butte County, damaging or destroy buildings and infrastructure.[50] Since 1950, 43 high-wind events have been recorded

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[47] Bedsworth, Louise, Dan Cayan, Guido Franco, Leah Fisher, Sonya Ziaja. 2018. "Statewide Summary Report." *California's Fourth Climate Change Assessment*. California Governor's Office of Planning and Research, Scripps Institution of Oceanography, California Energy Commission, California Public Utilities Commission. Publication number: SUM-CCCA4-2018-013.

[48] Butte County, 2019, Local Hazard Mitigation Plan, Chapter 4: Risk Assessment, http://www.buttecounty.net/Portals/19/LHMP/2019/CH4ButteCountyLHMPUpdateChapter4RiskAssessment.pdf?ver=2019-11-13-122000-400.

[49] Butte County, 2019, Local Hazard Mitigation Plan, Chapter 4: Risk Assessment, http://www.buttecounty.net/Portals/19/LHMP/2019/CH4ButteCountyLHMPUpdateChapter4RiskAssessment.pdf?ver=2019-11-13-122000-400.

[50] Butte County, 2019, Local Hazard Mitigation Plan, Chapter 4: Risk Assessment, http://www.buttecounty.net/Portals/19/LHMP/2019/CH4ButteCountyLHMPUpdateChapter4RiskAssessment.pdf?ver=2019-11-13-122000-400.

in Butte County. Strong winds and heavy rainfall are the most common types of severe weather in the project area.

4. Agricultural and Forestry Pests and Diseases

The forests and farms of Butte County face risk from various pests and diseases that may affect crop plants, trees, and livestock. These pests and diseases can cause plants and animals to grow slower, damage them so that their products are less appealing and harder to sell, or even kill them. Though there are treatment options for several agriculture and forestry diseases, some have no cure. The forests face particular harm from insects and other pests, diseases caused by bacteria or viruses, fungal infections, and other conditions that can affect the health of forest trees and plants. Specific pests and diseases include sudden oak death, red turpentine beetle, western pine beetle, balsam woolly adelgid, root-feeding bark beetle, pitch canker, and Diplodia diseases.[51]

One of the most direct effects of climate change is that average temperatures will increase, and this has a bearing on many pests and diseases. Many pests and organisms that carry diseases are most active during warmer months, so the threat of infection or infestation can be higher during this time of year. Temperatures are expected to get warmer earlier in the year and remain warmer until later in the year due to climate change, creating a wider activity window for pests and diseases. Warmer temperatures may make Butte County more habitable to pest and disease organisms, creating new threats to agriculture and forestry not previously seen in the county. Agriculture, forests, and livestock may be harmed and weakened by warmer temperatures and changes in precipitation such as drought, which can leave them more susceptible to pests and diseases or inhibit their ability to fight infestations or infections.

In places where forests are a scenic and recreation attraction—and an important contributor to local quality of life—such as the conifer forests, ecosystem pests and diseases can cause significant economic harm. Dead trees or tree limbs may fall, especially during high winds, and can damage or destroy buildings and structures, cars, and other property. Falling trees or tree limbs may block roadways and cause injuries or even fatalities to community members and visitors. Dead trees and other plants can also create more fuel for wildfires.

[51] California Forest Pest Council. 2018. *2018 California Forest Pests Conditions*. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd617799.pdf.

5. Human Health Hazards

Human health hazards are bacteria, viruses, parasites, and other organisms that can cause diseases and illness in people. Some of these diseases may only cause mild inconvenience and be isolated cases, but others are potentially life threatening and cause epidemics or pandemics. Examples include hantavirus pulmonary syndrome, Lyme disease, West Nile virus, and influenza, which can be debilitating or fatal for some of the population. These diseases are carried by animals such as mice and rats, ticks, and mosquitos, which are usually seen as pests even if they do not cause infections.

The most recent virus to harm Butte County is SARS-CoV-2 (COVID-19), which has created a life-threatening worldwide pandemic. As of February 24, 2021, according to the Butte County Public Health Department, Butte County has seen 10,702 cases and 160 deaths from the virus.

Similar to forestry and ecological pests and diseases, changes in temperature and precipitation can increase the rates of infections because many of the animals that carry diseases are more active during warmer weather. Warmer temperatures earlier in the spring and later in the fall can cause these animals to be active for longer periods, increasing the time for the disease to be transmitted. Warmer temperatures and higher levels of rainfall lead to increased populations of animals such as mosquitos, rodents, and ticks, creating a greater risk of diseases carried by these animals.

18 AGRICULTURE

The focus of this chapter is to describe Butte County's valuable agricultural resources. Agriculture contributes to the physical, economic, and cultural character of Butte County. Therefore, the County regards agriculture and the preservation of agriculture as a high priority. This chapter describes the state of agriculture in Butte County and the policy techniques employed by the County to preserve agriculture, as physical land and as a viable component of the economy.

A. Regulatory Setting

This section describes a number of State and local policies that Butte County has adopted to enhance and preserve agriculture as a resource in Butte County.

1. The Williamson Act

The California Land Conservation Act, better known as the Williamson Act, is Butte County's primary agricultural preservation technique. Statewide Williamson Act preserves agricultural and open space lands through property tax incentives and voluntary restrictive use contracts administered by the County under State regulations. Private landowners voluntarily restrict their land to agricultural and compatible open space uses under minimum 10-year rolling term contracts, with counties and cities also acting voluntarily. In return, private landowners receive property tax assessments that are lower than usual because the rate is not based on unrestricted market value, instead the tax rate is based on farming or open space uses.[1] Lands under Williamson Act contracts are shown in Figure 18-1.

Only land located within a locally designated "Agricultural Preserve" is eligible for a Williamson Act contract, but not all land within an Agricultural Preserve must be under contract.[2] By State law, an Agricultural Preserve must be designated by the local government, must consist of no fewer than 100 acres and may be made up of land in one or more ownerships. Landowners with fewer than 100 acres may combine with neighbors to form preserves, provided the properties are contiguous. A board of supervisors or city council can establish smaller preserves under unique circumstances if the preserve is consistent with the jurisdiction's General Plan.[3]

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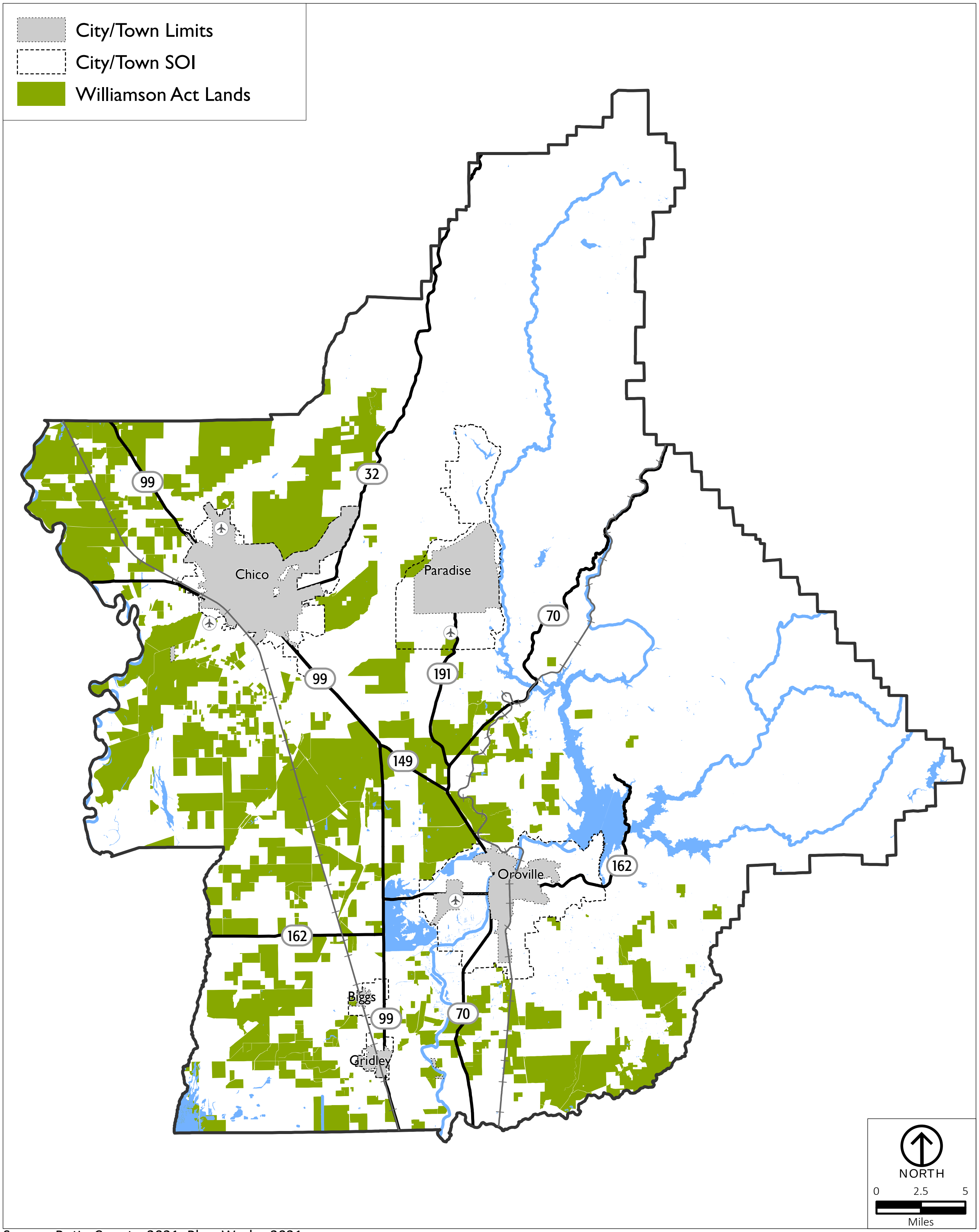
[1] Butte County, *Williamson Act Brochure*, https://www.buttecounty.net/Portals/10/Docs/PIH/PIH-7_Williamson%20Act%20Brochure.pdf , accessed February 15, 2021.

[2] California Department of Conservation, Land Conservation (Williamson) Act. https://www.conservation.ca.gov/dlrp/wa/Pages/LCA_QandA.aspx, accessed February 15, 2021.

[3] California State Government Code Section 51230.

Butte County adopted the Williamson Act in 1967, two years after the Act was passed by the State. Initiation into a Williamson Act contract is coordinated voluntarily by individual farmers and without oversight from the County. In 1967, the Butte County Board of Supervisors established 10 agricultural preserve areas that cover the entirety of the county. To qualify for a Williamson Act contract, the County sets a minimum parcel size requirement depending on the type of activity. Orchards, including vineyards, fruit, nut, and similar crops, require a minimum parcel size of 20 acres per contract. Field crops, open space uses, and irrigated pasture or irrigated rice production require a minimum parcel size of 80 acres per contract. Dry land grazing requires a minimum 160 acres per contract. The Williamson Act Advisory Committee and County Board of Supervisors can allow a 2-percent deviation from the minimum contract acreage mentioned above.[4]

[4] Butte County, 2020, *Uniform Rules and Procedures For Implementing the California Land Conservation (Williamson) Act*, pages 11-12.



Source: Butte County, 2021; PlaceWorks, 2021

FIGURE 18-1

WILLIAMSON ACT LANDS

In 2015, the most recent year for which Farmland Mapping and Monitoring Program (FMMP) data is available, there were a total of 215,700 acres enrolled in Williamson Act contracts in Butte County. Of the total acreage, approximately 123,600 acres were classified as Prime Farmland. Between 2014 and 2016, Butte County had an average of approximately 192,400 acres dedicated as Prime Farmland.[5] Therefore, the Williamson Act preserved about 64 percent of the county's Prime Farmland in 2015. Butte County depends on the Williamson Act as its main regulatory tool to preserve agricultural lands in the face of development pressures. The program is popular throughout the state since it is voluntary and imposes no requirements on landowners other than prohibiting urban development during the duration of contracts.[6] The remaining 92,100 acres of land enrolled in Williamson Act contracts in 2015 were classified as Non-Prime Farmland and undesignated land.

Since the 1980s, the Williamson Act program has protected about one third of California's privately held land and one half of the state's agricultural land;[7] however, the program also has some weaknesses as an agricultural preservation tool, and Butte County faces these same problems. Most obvious, it is purely a voluntary program and therefore relies on the willingness of landowners to participate. More important, the financial benefits of participation may not be sufficient for landowners to participate, particularly since property tax increases are already limited under California's Proposition 13. It is debatable whether the Williamson Act is effective in limiting growth around cities since landowners on the urban edge can use the law's 10-year non-renewal provisions and/or cancellation provisions to withdraw from the program and sell land for more lucrative development.

For landowners on the urban fringe of growing cities, there is higher economic incentive to entertain development opportunities than to enroll their property into a Williamson Act contract. When establishing a Sphere of Influence (SOI) boundary, Butte County Local Agency Formation Committee (LAFCO) considers if there are any lands enrolled in Williamson Act contracts. In the last 10 to 11 years, Butte LAFCO adopted new SOI boundaries for all jurisdictions in the

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[5] California Department of Conservation, 2014-2016, *California Farmland Conversion Report, Page 36*.

[6] Alvin D. Sokolow and Mica Bennett, *Conserving Agricultural Land Through Compensation*, December 2004, page 30 to 31.

[7] California Department of Conservation, Williamson Act Program Overview, *https://www.conservation.ca.gov/dlrp/wa/Pages/wa_overview.aspx*, accessed February 15, 2021.

county, except for the Town of Paradise. During this process, Butte LAFCO made a determination on whether the new SOI boundary contained any land enrolled in Williamson Act contracts.

In 2015, LAFCO adopted the SOI Plan for the City of Biggs and found the new SOI boundary did not contain any Williamson Act lands. The SOI for the City of Gridley was amended in 2010 and one parcel was enrolled in a Williamson Act contract at the time; however, the landowner submitted a notice of non-renewal of its contract, which was set to expire in 2014. According to the adopted SOI plan for the City of Chico, there are no Williamson Act lands within the City's SOI boundary and the City plans to "continue using the Greenline as a boundary to restrict development on the prime farmlands west of Chico."[8] The City of Oroville SOI previously included five properties enrolled in Williamson Act contracts but removed the five properties when the new SOI boundary was adopted in 2014.

The State Department of Conservation conducts random audits for general compliance with the Williamson Act program in each of the participating counties. Butte County was last audited in 2004. The Butte County Board of Supervisors approved the latest Butte County Uniform Rules and Procedures for Implementing the California Land Conservation (Williamson) Act by resolution on January 23, 2007.[9] Since then, there have been several amendments adopted that revised the Uniform Rules and Procedures document. One of the amendments allowed the Board of Supervisors to reduce the contract term agreement from ten years to nine years for contract holders during the period of 2012 through 2015.

An extension of the Williamson Act, called the Farmland Security Zone (FSZ) Program, permits farmers and ranchers to garner an additional 35 percent property tax reduction by keeping their land in agriculture for a minimal initial term of 20 years. This program passed through the State legislature in 1998 and has gained popularity in many counties but has yet to be adopted in Butte County.

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[8] Butte LAFCO, October 2018, *City of Chico Sphere of Influence Plan,* page 29.

[9] Butte County Department of Development Services, Butte County Uniform Rules and Procedures For Implementing the California Land Conservation (Williamson) Act, https://www.buttecounty.net/Portals/10/Docs/LCA/LCARulesUpdate_1-14-20.pdf?ver=2020-01-29-145414-303. Accessed February 15, 2021.

2. Agricultural Protection Zoning

The Butte County Zoning Ordinance (BCZO) defines the zoning regulations for the unincorporated areas of Butte County. The BCZO identifies two specific zoning types that designate agriculture as a principal land use: agricultural (A) and agricultural services (AS) zones. The current ordinance was adopted in November of 2012. Chapter 1 of the Setting and Trends Report provides an in-depth discussion of the BCZO. The full text of the Zoning Ordinance is also available on-line on the County's website. For the purposes of this section, these two zoning types will be referred to as Agricultural Protection Zones (APZ).

APZ increases the likelihood that parcels designated for agriculture will remain in agricultural production. One way that APZ accomplishes this is by establishing a minimum acreage for parcels designated for agriculture, allowing for its viable agricultural-commercial use. Implementing a minimum acreage prevents parcels from subdivision, whereby smaller farm parcels suffer from reduced economies of scale and increased contact with incompatible land uses. According to the American Farmland Trust, "a minimum lot size of 20 acres, combined with other restrictions, may be sufficient to reduce development pressures in areas where land is very expensive and farming operations are relatively intensive."[10] In addition to regulating lot sizes, APZ also defines permissible uses, housing densities, design guidelines and restrictions on ancillary commercial agriculture activities, all with the intent of preserving APZ parcels in agricultural uses.

As mentioned before, the BCZO differentiates between agricultural and agricultural-residential zones. Agricultural zones are A-20, A-40, A-80, and A-160; they provide for agricultural uses with minimum lot areas of 20, 40, 80 and 160 acres, respectively. In addition, the agricultural zones permit only one single-family dwelling per parcel. Agricultural zones are restricted to agricultural uses and housing facilities for agricultural employees. Residential uses are not permitted in the Agricultural Service zone except for caretaker quarters as an accessory use.

The residential zones that allow agricultural activities include Foothill Residential, Foothill Country Residential, Rural Residential, Rural Country Residential, Very Low Density Residential, and Very Low Density Country Residential. These zones permit animal grazing, crop cultivation, private stables, on-site agricultural product sales, and other similar agricultural uses. Single-family dwellings on larger lots are permitted uses in these zones. Small residential care homes and secondary dwelling

[10] Institute for Local Self Government, *Farmland Protection Action Guide, 24 Strategies for California,* 2002.

units are also permitted as-of-right, in accordance with State housing law. The second unit allowance is intended to provide additional housing opportunities by encouraging property owners to develop smaller granny flats or other small accessory dwelling units in conjunction with an existing single-family home.

APZ is generally established where environmental factors, such as soil conditions and water availability, are most amenable to farming. The soils in Butte County range from Class I to VIII, with Class I defined as "very good cultivable land." Butte County's agricultural protection zones are located on the best soils in the western portion of the county. Soil classes on the west side of Butte County range from I to IV. High water availability in this region is supplied by the Sacramento River, which runs along the western boundary of the county. Because environmental conditions vary within Butte County, APZ allows for the most cultivable land to be reserved for agricultural purposes.

3. Urban Growth Boundaries

Urban growth boundaries (UGBs) separate urbanized areas from non-urbanized areas by identifying the locations in which urbanization can occur. They are implemented to control outward expansion of development, encourage increased densities within the urban core and establish protected greenbelts of agriculture or open space around the perimeter of an urban area.

UGBs create a clearly defined agricultural-rural interface, establish certainty for city and county governments and landholders, and minimize the need for other resource intensive land protection mechanisms. When their modification requires voter approval, they are particularly potent as a means to halt urbanization. They can also limit land supply, thereby increasing housing prices.[11]

UGBs can function at the city level, the county level, or as a coordinated effort between both jurisdictions. The Chico Area Greenline is an example of a UGB that is coordinated by both the City of Chico and Butte County. The Greenline policy is outlined in the County's existing Land Use Element. The Greenline is at Chico's western city limit, dividing prime agricultural farmlands to the west of Chico from non-prime farmland in the east. It serves to restrict development on the prime farmlands west of Chico and preserves this area for agricultural production. As Chico grows, development is intended to be pushed east of the Greenline and onto non-prime farmlands.

[11] The Center for Rural and Regional Innovation – Queensland, *The Protection of Production on Agricultural Lands,* May 2005, page 48.

The Butte County General Plan 2030 Agricultural Element includes goals and policies aimed at preventing the County's agricultural land from being converted to non-agricultural uses. The Greenline is subject to review by the Butte County Board of Supervisors every five years.

4. Agricultural Buffers

Agricultural buffers are physical separations between residential and agricultural uses of land.[12] Typically, they are strips or corridors of vegetated land intended to ameliorate impacts from agricultural operations upon urbanized areas, and vice-versa.[13] They may contain grassy or treed areas, providing a more natural environment than much of the intensively farmed land surrounding them.[14] They can also be used for recreation by urban residents.

Buffers can be used to minimize or avoid urban/agricultural land use conflicts, and to physically mark an UGB (like the Greenline). They can help reduce actual or perceived impacts on neighboring residents (e.g., noise, odor, spray) and on agricultural operations (e.g., theft, trespass).[15] They also provide environmental benefits such as improved water quality, reduced phosphorus and nitrogen runoff, habitat creation, and increased biodiversity, as well as social benefits such as improved aesthetic quality of the landscape and increased recreational opportunities.[16]

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[12] Great Valley Center, *Can City and Farm Coexist? The Agricultural Buffer Experience in California*, Modesto, CA, March 2002, page 1.

[13] William C. Sullivan, Olin M. Anderson, and Sarah Taylor Lovell, "Agricultural buffers at the rural-urban fringe: an examination of approval by farmers, residents, and academics in the Midwestern United States," *Landscape and Urban Planning,* Volume 69, 2004, page 299.

[14] William C. Sullivan, Olin M. Anderson, and Sarah Taylor Lovell, "Agricultural buffers at the rural-urban fringe: an examination of approval by farmers, residents, and academics in the Midwestern United States," *Landscape and Urban Planning,* Volume 69, 2004, page 301.

[15] City of Brentwood Agricultural Buffers website, http://www.ci.brentwood.ca.us/boards/aarg/enterprise/agricultural_buffers.cfm, accessed on May 18, 2006.

[16] William C. Sullivan, Olin M. Anderson, and Sarah Taylor Lovell, "Agricultural buffers at the rural-urban fringe: an examination of approval by farmers, residents, and academics in the Midwestern United States," *Landscape and Urban Planning,* Volume 69, 2004, page 301.

In February 2007, the County adopted Ordinance No. 3953, also known as the Agriculture Buffer Setback Ordinance. Under this program, the zoning ordinance was amended to require 300-foot agricultural buffers for all new residential development in Butte County. This mandatory buffer is required for all residential projects on lands zoned Agriculture, other zones within 300 feet of the boundary of Agriculture zones, areas inside and within 300 feet of sphere of influence boundaries where the boundary abuts parcels zoned Agriculture, and areas within 300 feet of a Williamson Act contract.[17] The program clearly establishes that it is the responsibility of the developer to create the buffer on the urbanized side of community boundaries or spheres of influence in the unincorporated areas of the county.

Agricultural buffer guidelines were adopted by the Board of Supervisors on December 16, 2008. The guidelines outline the purpose and applicability of agricultural buffers and the process for determination of unusual circumstances when applying or modifying the 300-foot buffer. The guidelines are currently being updated, following the direction of the Board of Supervisors.

In order for buffers to be effective in limiting off-site impacts, a large tract of land must be available to provide an agricultural buffer.[18] Buffer lands also require a management entity to maintain them, and to effectively deal with issues of trespass, vandalism, litter, theft, or dogs. If not properly maintained and operated, buffer open space can appear as "unused" land, since it is generally not developed for either urban uses or agriculture. Although the developer will be responsible for creating the buffer, it must be recognized that it is still agricultural land that is being taken out of production.

B. Existing Conditions

This section describes agricultural land with respect to its physical conditions and the unique geography and environmental factors that contribute to high agricultural productivity in Butte County.

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[17] Butte County, 2012, *Butte County Zoning Ordinance*, page 121.

[18] CRCOG, *Agricultural Land Preservation: Fact Sheet*, https://crcog.org/wp-content/uploads/2016/07/Ch02_FactSheet_AgLand.pdf, accessed February 15, 2021, page 2.

1. Agricultural Environment

Butte County is in the Sacramento Valley, a vast, flat floodplain that is particularly amenable to farming. Within the county, agriculture is the largest land use, with parcels of farmland spanning from east of the Sacramento River to the foothills of the Southern Cascade and Sierra Nevada mountain ranges. The majority of Butte County farmland is aggregated in the northwest, in the central county and in the southwest, away from the incorporated cities. The largest, continuous parcels of agricultural land are located where the environmental conditions are most favorable for farming.

The farming environment in Butte County is rich with high quality soils. Its location in the floodplains of the Sacramento River provides fertile, alluvial sediment that is abundant with nutrients. The State authority on farmland classification is the FMMP, which is overseen by the California Division of Land and Resource Protection. The FMMP rates the quality of agricultural land according to soil ratings and land use. The most recently published FMMP survey of Butte County is from 2016. The FMMP defines land uses in Butte County by the following categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-up Land, Other Land, and Water Area. According to the *California Farmland Conversion Report 2014-2016*, there are over 637,600 acres of land suited for agricultural use in Butte County.[19]

Most agricultural land in the county is designated as Grazing Land and Prime Farmland; those farmland types account for approximately 592,700 acres of land. Prime Farmland has the best chemical and physical features to support long term agricultural production while Grazing Land is suited for grazing of livestock. Approximately 45,000 acres of agricultural land is designated as Unique Farmland and Farmland of Statewide Importance.[20] Unique Farmland includes land with lesser quality soil and may include non-irrigated vineyards or orchards. Farmland of Statewide Importance is similar to Prime Farmland, except the land is located on steeper slopes or in areas with less ability to retain soil moisture. Figure 18-2 shows agricultural lands in Butte County, as mapped by FMMP in 2016.

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[19] California Department of Conservation, 2014-2016, *California Farmland Conversion Report, Page 36*.

[20] California Department of Conservation, 2014-2016, *California Farmland Conversion Report, Page 36*.

2. Agricultural Lands

A variety of crops can be grown in Butte County because of the temperate Mediterranean climate, including fruits and nuts, field, seed, and vegetable crops. Other agricultural goods, such as livestock, apiary, nursery plants, and timber are also produced in Butte County. The Office of the Agricultural Commissioner releases an annual summary report, the "Crop Report". The Crop Report provides statistics on land use and productivity for agriculture in Butte County, and can be accessed via the internet at:

https://www.buttecounty.net/agriculturalcommissioner/Documents/Crop-Reports.

The three most land intensive crops in the county are rice, almonds, and English Walnuts. In 2019, about 22.8 percent of total agricultural acreage was in rice crop production, 13.2 percent produced English Walnuts and 9.2 percent was dedicated to almonds[21]. Of the overall crop types, field crops occupy the most land in the county, at approximately 310,500 acres. Fruit and nut crops occupy the second highest amount of land, at approximately 108,000 acres.

From 2015 to 2019, the total number of acres in agricultural production in Butte County changed from year to year, but with an overall increase. In 2015, approximately 420,000 acres were dedicated to farming; in 2016, this acreage increased to about 430,000 acres. In 2017 and 2018, the acreage decreased to approximately 417,000 and 367,000, respectively. The total number of acres in agricultural production increased to approximately 425,000 acres in 2019.[22] During this time, the total harvested acreage remained steady for most crop types. Fruit and nuts, as a general crop type, has increased in total harvested acreage, adding 2 percent of all agricultural acres. The number of acres dedicated to English Walnuts has increased from approximately 48,000 acres in 2015 to over 56,000 acres in 2019. Timber harvests increased during this time, from 60 million board feet in 2015 to over 68 million board feet in 2019.[23] Field crop types decreased from approximately 309,400 acres in 2017 to 253,600 acres in 2018, but they rose back up to about 310,500 acres in 2019. Including all crops, livestock, nursery stock, apiary products and timber, the total gross value of agricultural production in Butte County was estimated at $688,369,916 in 2019.

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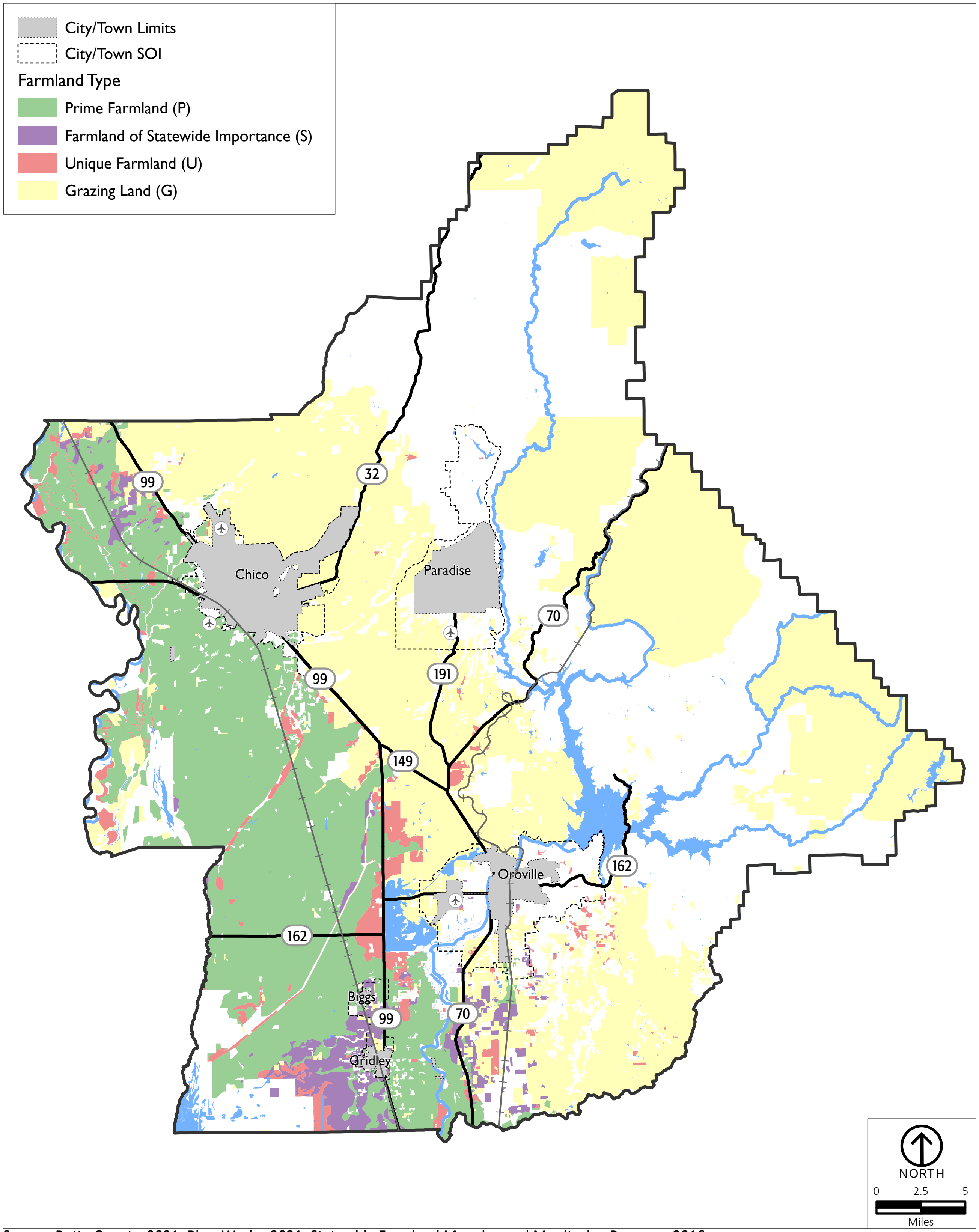
[21] Butte County Agricultural Commissioner, 2019, *2019 Crop Report.*

[22] Butte County Agricultural Commissioner, 2019, *2019 Crop Report.*

[23] Butte County Agricultural Commissioner, *2015 Crop Report* and *2019 Crop Report.*



Source: Butte County, 2021; PlaceWorks, 2021; Statewide Farmland Mapping and Monitoring Program, 2016

FIGURE 18-2

AGRICULTURAL LANDS

3. Agricultural Economy

The agricultural economy in Butte County is strong. The 2019 gross value of agricultural production of $688 million reported above represented a $57 million increase over the 2018 value. In 2015, the gross value reached over $772 million.

Butte County grew three crops that earned over 100 million dollars in 2019. The top three money-making crops were walnuts, rice, and almonds. The annual value for walnuts and almonds in Butte County has decreased since 2015, but the value of rice increased during that time. The gross value for rice in 2015 was over $138 million and, in 2019, the value for rice increased to over $166 million. Although the value of almonds has decreased since 2015, it is still the most valuable crop in Butte County, as of 2019.

At the same time, agriculturalists are introducing innovative and new approaches for certain areas of the county, such as trellised olives for mechanized harvesting and niche crops, such as botanicals and organics.

Agriculturists, as part of a traditional industry, are looking for modern, innovative ways to reintroduce farming culture and recapture earnings. A trend in Butte County, and throughout the state, creates an industry around agricultural tourism. Agri-tourism, as it is commonly referred to, is a service that agriculturalists can provide. By reinventing farmland as a destination attraction, agriculturalists promote education of agricultural land and farming practices. The County's Zoning Ordinance has a Unique Agricultural Overlay zoning designation that allows agri-tourism related uses and special events. Permitted uses in the overlay zone include farm tours, bed and breakfasts, agricultural-related museums, on-site fruit and vegetable picking, weddings, and farm trail events. The Zoning Ordinance also has provisions for winery, olive oil, fruit and nut, micro-brewery and micro-distillery production facilities to encourage tourism in the county and support agricultural activities related to these uses.

4. Farmland Conversion Trends

According to the Farmland Mapping and Monitoring Program, between 2014 and 2016, Butte County gained approximately 1,100 acres of important farmland but lost approximately 1,200 acres of grazing land to urban or other land uses. According to Butte County's 2016 Crop Report, the county has lost 13,635 acres of farmland over a 12-year period (2004-2016) to urban and built-up land and other land uses. The loss of farmland includes 4,996 acres of Prime Farmland, 1,678 acres of Unique Farmland, and 6,236 acres of Grazing Land. Factors that lead to conversion of agricultural land include being near residential areas, urban uses, smaller agricultural parcels, expanded or new roads, or being close to other non-agricultural uses.[24]

[24] Sustainable Agricultural Lands Conservation Strategy Agricultural Lands Conservation, 2017, https://www.buttecounty.net/Portals/10/Docs/SALC/SALC%20Ag%20Land%20Conservation%20new.pdf, accessed February 13, 2021.

19 GREENHOUSE GAS EMISSIONS

Greenhouse gases (GHGs) are gases in the atmosphere that absorb infrared light, thereby retaining heat in the atmosphere and contributing to what is known as the greenhouse effect. Scientists have concluded that human activities are adding large amounts of these GHGs to the atmosphere, increasing the amount of trapped heat. The warmer atmosphere creates changes in Earth's climate system, collectively known as climate change. The primary source of these GHGs is fossil fuel use, such as petroleum and natural gas. The Intergovernmental Panel on Climate Change (IPCC) has identified three major GHGs—carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)—that are likely cause of an increase in global average temperatures observed in the twentieth and twenty-first centuries. Other GHGs identified by the IPCC that contribute to global warming to a lesser extent are nitrogen trifluoride (NF_3), sulfur hexafluoride (SF_6), hydrofluorocarbons, perfluorocarbons, and chlorofluorocarbons.[1]

The major GHGs are briefly described as follows:

- **Carbon dioxide (CO_2)** enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, respiration, and as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is removed from the atmosphere (sequestered) when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH_4)** is emitted during the production, transport, and combustion of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal landfills and wastewater treatment facilities.
- **Nitrous oxide (N_2O)** is emitted during agricultural and industrial activities as well as during combustion of fossil fuels and the decomposition of solid waste and wastewater.

[1] IPCC, 2014: *Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

Different GHGs trap different amounts of heat in the atmosphere over their lifetimes. The relative difference in the amount of heat trapped by different gases is known as the global warming potential (GWP). Carbon dioxide has a GWP of 1 and all other gases have a GWP relative to the value of carbon dioxide. For example, methane has a GWP of 28, meaning that one molecule of methane will trap, on average, 28 times as much heat over its lifetime in the atmosphere as 1 molecule of CO_2. The GWP is used to express GHG emissions from different gases as a single unit, known as carbon dioxide equivalent (CO_2e). For example, 1 metric ton (MT) of carbon dioxide would be expressed as 1 $MTCO_2e$, while 1 MT of methane would be expressed as 28 $MTCO_2e$. As the science of GHGs evolves, the GWPs of different gases are revised. Table 19-1 shows how GWPs of common GHGs have changed over time.

TABLE 19-1 GHG EMISSIONS AND THEIR RELATIVE GLOBAL WARMING POTENTIAL COMPARED TO CO_2

GHGs	Second Assessment Report (SAR) Global Warming Potential Relative to CO_2[a] (1995)	Fourth Assessment Report (AR4) Global Warming Potential Relative to CO_2[a] (2007)	Fifth Assessment Report (AR5) Global Warming Potential Relative to CO_2[a] (2014)
Carbon Dioxide (CO_2)	1	1	1
Methane[b] (CH_4)	21	25	28
Nitrous Oxide (N_2O)	310	298	265

Notes:
a. Based on 100-year time horizon of the GWP of the air pollutant compared to CO_2.
b. The methane GWP includes direct effects and indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.

Sources: IPCC, 1995, *Second Assessment Report: Climate Change 1995*; IPCC, 2007, *Fourth Assessment Report: Climate Change 2007*; IPCC, 2014, *Fifth Assessment Report: Climate Change 2014*.

In addition to the major GHGs described herein, black carbon also contributes to climate change both directly, by absorbing sunlight, and indirectly, by depositing on snow (making it melt faster) and by interacting with clouds and affecting cloud formation. Black carbon is the most strongly light-absorbing component of particulate matter (PM) emitted from burning fuels, such as coal, diesel, and biomass. Reducing black carbon emissions globally can have immediate economic, climate, and public health benefits. California has been an international leader in reducing emissions of black carbon, with close to 95-percent control expected by

2020 due to existing programs that target reducing PM from diesel engines and burning activities.[2]

A. Regulatory Setting

This section discusses the federal, State, and local policies and regulations that are relevant to GHG emissions in Butte County.

1. Federal Regulations

The U.S. Environmental Protection Agency (EPA) announced on December 7, 2009, that GHG emissions threaten the public health and welfare of the American people and that GHG emissions from on-road vehicles contribute to that threat. The U.S. EPA's final findings respond to the 2007 U.S. Supreme Court decision that GHG emissions fit within the Clean Air Act definition of air pollutants. The findings did not themselves impose any emission-reduction requirements but allowed the U.S. EPA to finalize the GHG standards proposed in 2009 for new light-duty vehicles as part of the joint rulemaking with the California Department of Transportation.[3]

To regulate GHGs from passenger vehicles, the U.S. EPA issued an endangerment finding.[4] The finding identifies emissions of six key GHGs—carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbons, hydrofluorocarbons, and sulfur hexafluoride—that have been the subject of scrutiny and intense analysis for decades by scientists in the United States and around the world. The first three constitute the majority of GHG emissions.

[2] CARB, 2017, March 14. *Short-Lived Climate Pollutant Reduction Strategy*, https://www.arb.ca.gov/cc/shortlived/shortlived.htm

[3] U.S. EPA. 2009, December. *USEPA: Greenhouse Gases Threaten Public Health and the Environment*. Science overwhelmingly shows greenhouse gas concentrations at unprecedented levels due to human activity. https://archive.epa.gov/epapages/newsroom_archive/newsreleases/08d11a451131bca585257685005bf252.html, accessed March 4, 2021.

[4] U.S. EPA, 2009. *USEPA: Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*. https://www.epa.gov/ghgemissions/endangerment-and-cause-or-contribute-findings-greenhouse-gases-under-section-202a-clean, accessed November 21, 2019.

a. U.S. Mandatory Reporting Rule for GHGs (2009)

In response to the endangerment finding, the U.S. EPA issued the Mandatory Reporting of GHG Rule that requires substantial emitters of GHG emissions (large stationary sources, etc.) to report GHG emissions data. Facilities that emit 25,000 MT or more of CO_2e per year are required to submit an annual report.

b. Update to Corporate Average Fuel Economy Standards (2021 to 2026)

The federal government issued new Corporate Average Fuel Economy (CAFE) standards in 2012 for model years 2017 to 2025, which required a fleet average of 54.5 miles per gallon in 2025. However, on March 30, 2020, the U.S. EPA finalized the updated CAFE and GHG emissions standards for passenger cars and light trucks and established new standards, covering model years 2021 through 2026, known as the Safer Affordable Fuel Efficient (SAFE) Vehicles Final Rule for Model Years 2021 through 2026. Implementation of the SAFE standards was halted by executive action in January 2021. It is not yet known if new standards will be established.

c. U.S. EPA Regulation of Stationary Sources under the Clean Air Act

Pursuant to its authority under the Clean Air Act, the U.S. EPA has been developing regulations for new, large stationary sources of emissions, such as power plants and refineries. Under former President Obama's 2013 Climate Action Plan, the U.S. EPA was directed to develop regulations for existing stationary sources as well. On June 19, 2019, the U.S. EPA issued the final Affordable Clean Energy (ACE) rule, which became effective on August 19, 2019. The ACE rule was crafted under the current administration's Energy Independence Executive Order. It officially rescinds the Clean Power Plan rule issued during the previous administration and sets emissions guidelines for states in developing plans to limit CO_2 emissions from coal-fired power plants.

2. State Regulations

Current State of California guidance and goals for reductions in GHG emissions are generally embodied in Executive Order S-03-05, Assembly Bill (AB) 32, Senate Bill (SB) 32, Executive Order B-30-15, and SB 375. These major GHG regulations are summarized herein.

a. Executive Order S-03-05

Executive Order S-03-05, signed June 1, 2005, set the following GHG-reduction targets for the State:

- Returning to 2000 emission levels by 2010.

- ♦ Returning to 1990 emission levels by 2020.
- ♦ Reducing emissions 80 percent below 1990 levels by 2050.

b. Assembly Bill 32

Also known as the Global Warming Solutions Act, AB 32 was signed August 31, 2006, to reduce California's contribution of GHG emissions. AB 32 follows the 2020 tier of emissions reduction targets established in Executive Order S-03-05. Under AB 32, the California Air Resources Board (CARB) prepared the *2008 Climate Change Scoping Plan*, the *2014 Climate Change Scoping Plan,* and the *2017 Climate Change Scoping Plan.*

c. Executive Order B-30-15

Executive Order B-30-15, signed April 29, 2015, sets a goal of reducing GHG emissions within California to 40 percent of 1990 levels by year 2030. Executive Order B-30-15 also directs CARB to update the Scoping Plan to quantify the 2030 GHG-reduction goal for the state and requires state agencies to implement measures to meet the interim 2030 goal as well as the long-term goal for 2050 in Executive Order S-03-05. It also requires the Natural Resources Agency to conduct triennial updates of the California adaption strategy, Safeguarding California, to ensure climate change is accounted for in state planning and investment decisions.

d. Senate Bill 32 and Assembly Bill 197

In September 2016, SB 32 and AB 197 were signed into law, making the Executive Order goal for year 2030 into a statewide mandated legislative target. AB 197 established a joint legislative committee on climate change policies and requires CARB to prioritize direct emissions reductions rather than the market-based cap-and-trade program for large stationary, mobile, and other sources. Executive Order B-30-15 and SB 32 required CARB to prepare another update to the Scoping Plan to address the 2030 target for the state. On December 14, 2017, CARB adopted the *2017 Climate Change Scoping Plan Update* (2017 Scoping Plan) to address the 2030 target for the state. The 2017 Scoping Plan establishes a new emissions limit of 260 $MMTCO_2e$ for the year 2030, which corresponds to a 40-percent decrease in 1990 levels by 2030.[5]

[5] CARB, 2017, *California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target*, https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf, accessed March 18, 2019.

e. Senate Bill 375

In 2008, SB 375, the Sustainable Communities and Climate Protection Act, was adopted to connect the GHG emissions-reductions targets established in the 2008 Scoping Plan to local land use decisions that affect travel behavior. Its intent is to reduce GHG emissions from light-duty trucks and automobiles (excludes emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations to local land use planning to reduce vehicle miles traveled (VMT) and vehicle trips. Specifically, SB 375 required CARB to establish GHG emissions-reduction targets for each of the 18 metropolitan planning organizations (MPOs). The Butte County Association of Governments (BCAG) is the MPO for Butte County and its jurisdictions. Pursuant to the recommendations of the Regional Transportation Advisory Committee (RTAC), CARB adopted per-capita reduction targets for each of the MPOs rather than a total magnitude reduction target. The reduction targets for BCAG are 6-percent reduction in per-capita vehicle-related emissions for 2020 and 7 percent for 2035, relative to 2005 levels.

3. Local Regulations

a. Butte County Air Quality Management District

The Butte County Air Quality Management District (BCAQMD) is the local air district responsible for local air quality regulation in Butte County. The BCAQMD's primary responsibility is to regulate stationary sources and develop plans to achieve and maintain air quality standards. CARB and the U.S. EPA have jurisdiction over controlling emissions from mobile sources. The BCAQMD has jurisdiction over air quality matters in Butte County. Formerly a department of the Butte County government, it is now an independent special district under California law.

BCAQMD's mission to improve air quality includes adopting and enforcing rules and regulations to attain and maintain air quality standards, issuing permits for and inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring air quality and meteorological conditions, awarding grants to reduce mobile emissions, implementing public outreach campaigns, assisting Butte County jurisdictions in addressing climate change, and updating and evaluating consistency with the Northern Sacramento Valley Air Quality Attainment Plan.

The stationary "direct" sources of air contaminants over which the BCAQMD has permit authority include, but are not limited to, power plants, gasoline stations, dry cleaners, internal combustion engines, and surface coating operations. BCAQMD does not, however, exercise permit authority over "indirect" emission sources.

Indirect sources are contributors to air pollution and include facilities and land uses that may not emit significant amounts of pollution directly themselves, but are responsible for indirect emissions, such as:

- Motor vehicle trips attracted to or generated by a land use;
- On-site combustion of natural gas and propane for heating;
- Architectural coatings (paints, stains) and consumer products; and
- Landscape maintenance.

The BCAQMD works with BCAG to ensure a coordinated approach in the development and implementation of transportation plans throughout the county. This coordination ensures compliance with pertinent provisions of the Clean Air Act and California Clean Air Act, as well as with related transportation legislation.

b. Butte County Climate Action Plan

The Butte County Board of Supervisors approved the County's first Climate Action Plan (CAP) on February 25, 2014. Butte County General Plan 2030 directed preparation, adoption, and implementation of the CAP to assist the State of California in meeting the GHG reduction goals for 2020. The CAP incorporates programs and actions to reduce GHG emissions, address climate change adaptation, improve community resilience to hazardous conditions associated with climate change, and improve quality of life in the county. The County is updating the CAP in 2021 to include reduction targets for 2030 and 2050 along with reductions strategies and an implementation program to achieve the targets. For more information on climate change-related hazards, refer to Chapter 17, Hazards and Safety.

B. Greenhouse Gas Emissions in California

In 2019, the State updated the statewide GHG emissions inventory for 2000 to 2017 emissions using the GWPs in IPCC's AR4.[6] Based on these GWPs, California produced 424.10 $MMTCO_2e$ GHG emissions in 2017. California's transportation sector was the single largest generator of GHG emissions, producing 40.1 percent of the state's total emissions. Industrial sector emissions made up 21.1 percent, and electric power generation made up 14.7 percent of the state's emissions inventory. Other major sectors of GHG emissions include commercial and residential (9.7

[6] Methodology for determining the statewide GHG inventory is not the same as the methodology used to determine statewide GHG emissions under AB 32 (2006).

percent); agriculture and forestry (7.6 percent); high GWP gases, such as refrigerants and leaks from industrial equipment (4.7 percent); and recycling and waste (2.1 percent).[7]

California's GHG emissions have followed a declining trend since 2007. In 2017, emissions from routine GHG-emitting activities statewide were 424 $MMTCO_2e$, 5 $MMTCO_2e$ lower than 2016 levels. This represents an overall decrease of 14 percent since peak levels in 2004 and 7 $MMTCO_2e$ below the 1990 level and the state's 2020 GHG target. During the 2000 to 2017 period, per-capita GHG emissions in California have continued to drop from a peak in 2001 of 14.0 $MTCO_2e$ per capita to 10.7 $MTCO_2e$ per capita in 2017, a 24-percent decrease. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product [GDP]) is declining, representing a 41-percent decline since the 2001 peak, while the state's GDP has grown 52 percent during this period. For the first time since California started to track GHG emissions, California uses more electricity from zero-GHG sources (hydro, solar, wind, and nuclear energy). [8]

C. Potential Climate Change Impacts for California

In California and western North America, observations of the climate have shown: (1) a trend toward warmer temperatures with an increase in extremely hot days and nights; (2) increase in the area burned by wildfires; (3) a smaller fraction of precipitation falling as snow; (4) an increase in frequency of drought and an increase in consecutive dry years; and (5) a shift (5 to 30 days earlier) in the timing of spring flower blooms.[9] Overall, California has become drier over time, with five of the eight years of severe to extreme drought occurring between 2007 and 2016, and unprecedented dry years in 2014 and 2015. Statewide precipitation has become

[7] CARB, 2019, August 26. *2019 Edition California Greenhouse Gas Inventory for 2000-2017: By Category as Defined in the 2008 Scoping Plan.* https://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed March 4, 2021.

[8] CARB, 2019, August 26. *California Greenhouse Emissions for 2000 to 2017: Trends of Emissions and Other Indicators.* https://www.arb.ca.gov/cc/inventory/data/data.htm, accessed November 21, 2019.

[9] California Climate Action Team, 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

increasingly variable from year to year, with the driest consecutive four years occurring from 2012 to 2015.[10]

According to the California Climate Action Team—a committee of representatives from 14 State agencies—even if actions could be taken to immediately curtail climate change emissions, global surface temperature change for the end of the twenty-first century is likely to exceed 1.5 degrees Celsius (°C) (1.1 degrees Fahrenheit [°F]) of warming relative to 1850.[11] Consequently, some impacts from climate change are now considered unavoidable. Global climate change risks to California are described herein and are shown in Table 19-2. For more information on climate change-related hazards, refer to Chapter 17, Hazards and Safety.

TABLE 19-2 SUMMARY OF GHG EMISSIONS RISK TO CALIFORNIA

Impact Category	Potential Risks
Public Health Impacts	Heat waves may be more frequent, hotter, longer, and occur earlier and later in the year Poor air quality made worse Higher temperatures increase ground-level ozone (i.e., smog) levels Some diseases or pests may be newly present or more active
Water Resource Impacts	Decreasing Sierra Nevada snowpack Challenges in securing adequate water supply Faster snowmelt Potential reduction in hydropower Loss of winter recreation
Agricultural Impacts	Increasing temperature Increasing threats from pests and pathogens Expanded ranges of agricultural weeds Declining productivity Irregular blooms and harvests

[10] Office of Environmental Health Hazards Assessment, 2018. *Indicators of Climate Change in California*. https://oehha.ca.gov/climate-change/2018-indicators-climate-change-california, accessed February 19, 2021.

[11] IPCC, 2013. "Summary for Policymakers." In: *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA., page 20.

Impact Category	Potential Risks
Coastal Sea-Level Impacts	Accelerated sea-level rise Increasing coastal floods Shrinking beaches Ocean acidification Worsened impacts on infrastructure
Forest and Biological Resource Impacts	Increased risk and severity of wildfires Lengthening of the wildfire season Movement of forest areas Conversion of forest to grassland Declining forest productivity Increasing threats from pest and pathogens Shifting vegetation and species distribution Altered timing of migration and mating habits Loss of sensitive or slow-moving species

Sources: California Climate Change Center, 2012, *Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California*; California Energy Commission, 2006. *Our Changing Climate: Assessing the Risks to California, 2006 Biennial Report*, CEC-500-2006-077; California Energy Commission, 2009. *The Future Is Now: An Update on Climate Change Science, Impacts, and Response Options for California*. CEC-500-2008-0077; California Natural Resources Agency, 2014. *Safeguarding California: Reducing Climate Risk, An Update to the 2009 California Climate Adaptation Strategy*.

D. Existing Conditions

As part of the work updating the County's CAP in 2021, the County prepared a set of new and revised GHG inventories, which are technical analyses to assess the total annual GHG emissions attributed to the unincorporated areas of Butte County from various activities. A GHG inventory is the first step in creating a strategy to reduce Butte County's annual emissions.

GHG emissions are generated by various activities that are largely commonplace in daily life. Some daily activities release GHG emissions in the location of the activity, such as GHGs released by driving a gasoline- or diesel-fueled vehicle. On the other hand, some activities cause GHG emissions to be released elsewhere, such as someone using electricity to power their home, which generates GHG emissions in the location of the power plant that supplies the power, and not in the home itself. Therefore, Butte County must consider the GHG emissions caused by activities attributed to the community, including GHG emissions generated both inside and outside their jurisdictional boundaries.

The County has two types of GHG inventories: community-wide inventories and County operations inventories.

- ♦ The community-wide GHG inventory identifies GHG emissions that result from activities of residents, employees, visitors, and other community members occurring within the community. Examples include residents driving cars, homes using water, and businesses using electricity.
- ♦ The County operations GHG inventory summarizes emissions that are a direct result of Butte County's government operations. Examples include electricity and water used in County buildings or the fuel used for County vehicles.

As part of the CAP Update, the County prepared new 2019 community-wide and County operations GHG inventories.

1. Community-wide GHG Inventory

The community-wide GHG inventory assessed GHG emissions from the following 10 categories of activities, known as sectors. Table 19-3 shows the total GHG emissions in 2019 along with the proportion each sector contributed to overall emissions.

- ♦ **Agriculture** includes GHG emissions from various agricultural activities, including agricultural equipment, crop cultivation and harvesting, and livestock operations.
- ♦ **Transportation** includes GHG emissions created by driving on-road vehicles, including passenger and freight vehicles.
- ♦ **Residential energy** includes GHG emissions attributed to the use of electricity, natural gas, and propane in residential buildings.
- ♦ **Nonresidential energy** includes GHG emissions attributed to the use of electricity and natural gas in nonresidential buildings.
- ♦ **Solid waste** includes the GHG emissions released from trash collected in the unincorporated areas of Butte County, as well as collective annual emissions from waste already in place at the Neal Road Landfill.
- ♦ **Off-road equipment** includes GHG emissions from equipment that does not provide on-road transportation, such as tractors for construction or equipment used for landscape maintenance.

- **Water and wastewater** accounts for the electricity used to transport every gallon of water or wastewater, as well as direct emissions resulting from the processing of waste material.
- **Stationary sources** are those emitted at large industrial sites, commercial businesses, warehouses, or power plants.
- **Land use and sequestration** includes GHG emissions absorbed and stored in trees and soils as part of healthy ecosystems and released into the atmosphere from development of previously undeveloped land.
- **Wildfire** includes emissions released as a result of wildfires.

TABLE 19-3 PROPORTIONS OF ANNUAL COMMUNITY-WIDE 2019 GHG EMISSIONS BY SECTOR

Sector	2019 $MTCO_2e$	2019 Proportion of Total
Agriculture	501,630	50%
Transportation	229,110	23%
Residential energy	90,730	9%
Solid waste	61,120	6%
Off-road equipment	59,310	6%
Nonresidential energy	37,350	4%
Water and wastewater	16,960	2%
Total Annual $MTCO_2e$	**996,210**	**100%**
Land use and sequestration	-346,340	—
Wildfire and controlled burns*	15,730	—

*Emissions related to wildfire and controlled burns are included as an informational item; information on stationary sources not available at the time of preparation.

All numbers are rounded to the nearest 10.

In 2019, the agriculture sector accounted for the largest share of GHG emissions in Butte County, with 50 percent of emissions. The transportation sector accounted for approximately 23 percent of emissions. Residential energy accounted for approximately 9 percent of total emissions, while solid waste and off-road equipment each made up 6 percent of total emissions. Nonresidential energy accounted for 4 percent of emissions while water and wastewater accounted for approximately 2 percent.

1. County Operations GHG Inventory

A County operations GHG inventory summarizes GHG emissions that are a direct result of Butte County's government operations. The County operations GHG inventory assessed six sectors, as listed below. Table 19-4 shows the total GHG emissions in 2019 along with the proportion each sector contributed to overall emissions.

- **Energy** includes the GHG emissions of electricity and natural gas used to power County buildings, facilities, and operations.
- **Commute** covers GHG emissions that result from the total annual miles that County staff drive to get to and from work.
- **Fleet** includes the GHG emissions released by County vehicles based on the total gallons of fuel used.
- **Solid waste** accounts for the GHG emissions released from the collection of trash at County buildings and facilities, as well as emissions from waste in place at the County-operated Neal Road facility.
- **Water and wastewater** accounts for the energy used to transport and process the water used and the wastewater generated at County buildings and facilities.
- **Refrigerant** includes the amounts of refrigerants used to refill air conditioners in County buildings and vehicles.

TABLE 19-4 PROPORTIONS OF ANNUAL COUNTY OPERATIONS 2019 GHG EMISSIONS BY SECTOR

Sector	2019 $MTCO_2e$	2019 Proportion of Total
Energy	2,640	6%
Commute	5,330	12%
Fleet	5,140	11%
Solid Waste	32,310	71%
Water and Wastewater	60	Less than 1%
Refrigerant	20	Less than 1%
Total Annual $MTCO_2e$	**45,500**	**100%**

The largest share of annual GHG emissions generated by County operations was from the solid waste sector, with 71 percent of emissions. The commute and fleet sectors made up the second- and third-largest share of emissions with 12 and 11 percent, respectively. GHG emissions from the energy sector contributed a total of 6 percent while water and wastewater and refrigerants each contributed less than 1 percent.

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