# Wolf Conflicts Research

## Idaho

Declared endangered under ESA in 1974. Reintroduced 35 wolves in 1995-1996 as part of USFWS’s recovery plan for wolves. Adopted the Idaho Wolf Conservation and Management Plan in 2002 with IFG responsible for wolf management following delisting. Revised the rules that govern the experimental non- essential population of reintroduced wolves in Idaho south of interstate 90 in 2005. Returned management to USFWS in 2010. Removed from federal ESA in 2011 and congress returned wolf management to the states.

5) Wolf Depredation Management – U.S. Department of Agriculture (USDA) Wildlife Services, in cooperation with IDFG, will take an incremental approach, guided by wolf numbers, to address wolf depredations. When the wolf population is low, more conservative methods will be applied whereas increasingly more aggressive control will be applied as numbers increase. Upon delisting, every individual has the right to protect their person and property, on private, state, and federal lands from wolf depredation.

Control: Depredation control becomes increasingly stringent until at <10 packs it reverts to the control plan specified in the final rule (50 CFR Part 17, page 80270). In the unlikely event the number of packs in Idaho falls below 10, depredations will be addressed with nonlethal control unless unusual circumstances absolutely necessitate the use of lethal control to end the depredation problem.

Defenders of Wildlife paid $49,746 in compensation to livestock operators in Idaho for confirmed or probable wolf-related losses from 1995-2000 (Table 5). Defenders of Wildlife also offers assistance intended to mitigate or prevent conflicts between wolves and livestock. It is unknown if Defenders of Wildlife will continue to compensate ranchers after delisting.

36-1107: “(c) Control of Depredation of Wolves. Wolves may be disposed of by livestock or domestic animal owners, their employees, agents and animal damage control personnel when the same are molesting or attacking livestock or domestic animals and it shall not be necessary to obtain any permit from the department. Wolves so taken shall be reported to the director within ten (10) days of being taken. Wolves so taken shall remain the property of the state. Livestock and domestic animal owners may take all nonlethal steps they deem necessary to protect their property. A permit must be obtained from the director to control wolves not molesting or attacking livestock or domestic animals. Control is also permitted by owners, their employees and agents pursuant to the Idaho department of fish and game harvest rules. For the purposes of this subsection, "molesting" means the actions of a wolf that are annoying, disturbing or persecuting, especially with hostile intent or injurious effect, or chasing, driving, flushing, worrying, following after or on the trail of, or stalking or lying in wait for, livestock or domestic animals.”

Current Management Approach

1. Keep state management authority by maintaining a well-distributed, self-sustaining wolf population.

Strategies

* 1. Use public hunting and trapping as a preferred means of managing wolves;
	2. Annually monitor whether at least 15 wolf packs are extant in Idaho;
	3. Annually monitor changes in trend of Idaho’s wolf population and in its distribution; and,
	4. Prioritize management to respond quickly, decisively, and effectively should monitoring indicate the need.
1. Prioritize agency actions and resources to aggressively address areas of recurring depredation on livestock and other domestic animals.

Strategies

* 1. Cooperate with livestock interests, the Idaho State Animal Damage Control

Board, the Idaho Wolf Depredation Control Board, and USDA APHIS Wildlife Services to reduce and document wolf depredations on livestock;

* 1. Take additional, aggressive action to reduce depredations in areas with frequent and abundant livestock depredations;
		1. Provide liberal opportunities for sport harvest of wolves;
		2. Authorize and encourage full pack removal in response to confirmed wolf depredations in chronic depredation areas; and,
		3. Provide liberal private kill authorizations near chronic depredation areas.
	2. Determine the extent of wolf predation in ungulate populations not meeting management objectives and reduce wolf predation impacts where appropriate.

Strategies

1. Strongly encourage public harvest of wolves; and,
2. Where harvest cannot be expected to resolve the effects of excessive wolf predation, implement area-specific Predation Management Plans.
	1. Improve data used to inform wolf management decisions. Strategies
3. Continue the mandatory harvest check for wolves;
4. Prioritize research that improves wolf monitoring techniques; and,
5. Use a defined experimental design to examine population effects of harvest to better inform management decisions.
	1. Provide a report summarizing wolf management activities on an annual basis.

## Montana

Montana law and administrative rules (ARM 12.9.1301-1305) allow a person to kill a wolf that is seen in the act of attacking, killing, or threatening to kill livestock:

* no permit is required and FWP must be notified within 72 hours of take or attempt to take,
* preserve the scene and leave the carcass where it was killed; carcass is surrendered to FWP,
* physical evidence of the wolf attack or that an attack was imminent is required (injured or dead livestock, broken fences, trampled vegetation and wolf sign) that would lead a reasonable person to conclude the attack was imminent,
* wolves cannot be intentionally baited, fed, or deliberately attracted

Montana's Livestock Loss Board was created to fulfill the compensation provisions of the Montana Gray Wolf Conservation and Management Plan. The program is administered through a 7-member, Governor- appointed citizen board and a program coordinator. The purpose of this program is to acknowledge the importance of economic viability and sustainability of individual livestock owners who are negatively affected by wolf recovery and to: • proactively apply prevention tools and incentives to decrease the risk of wolf-caused losses, • provide financial reimbursements to producers for wolf-caused losses based on program criteria.

87-1-901. Gray wolf management -- rulemaking -- reporting.

1. Except as provided in subsection (2), the commission shall establish by rule hunting and trapping seasons for wolves. For game management purposes, the commission may authorize:
	1. the issuance of more than one Class E-1 or Class E-2 wolf hunting license to an applicant; and
	2. the trapping of more than one wolf by the holder of a trapping license.
2. The commission shall adopt rules to allow a landowner or the landowner's agent to take a wolf on the landowner's property at any time without the purchase of a Class E-1 or Class E-2 wolf license when the wolf is a potential threat to human safety, livestock, or dogs. The rules must:
	1. be consistent with the Montana gray wolf conservation and management plan and the adaptive management principles of the commission and the department for the Montana gray wolf population;
	2. require a landowner or the landowner's agent who takes a wolf pursuant to this subsection
3. to promptly report the taking to the department and to preserve the carcass of the wolf;
	1. establish a quota each year for the total number of wolves that may be taken pursuant to this subsection (2); and
	2. allow the commission to issue a moratorium on the taking of wolves pursuant to this subsection (2) before a quota is reached if the commission determines that circumstances require a limitation of the total number of wolves taken.
4. Public land permittees who have experienced livestock depredation must obtain a special kill permit authorized in 87-5-131(3)(b) to take a wolf on public land without the purchase of a Class E-1 or Class E- 2 license.
5. The department shall report annually to the environmental quality council regarding the implementation of 87-5-131, 87-5-132, and this section.

ARM 12.9.1301 - The department uses an adaptive management framework for the gray wolf, meaning that if the statewide number of wolves exceeds 15 breeding pairs, the department may, as outlined in these rules, approve lethal control of wolves. If there are fewer than 15 breeding pairs, the department will allow only conservative management of the wolf populations so that the number of breeding pairs does not go below 10 but may still approve lethal control.

ARM 12.9.1305 - (3) Before considering lethal control of a problem wolf for livestock conflict, the department or USDA Wildlife Services shall conduct the following investigation:

* 1. the department or USDA Wildlife Services will conduct a field investigation to determine if the death of the livestock was due to natural causes or a predator; and
	2. if a predator killed the livestock, the department or USDA Wildlife Services will examine the evidence at the scene to determine if a wolf was responsible.
1. The department may authorize a livestock owner, immediate family members, or employees by a permit to take a problem wolf under the following circumstances and conditions as part of a coordinated agency response to confirmed livestock damage due to wolves:
	1. when the department or USDA Wildlife Services confirms that a wolf killed the livestock;
	2. when the department or USDA Wildlife Services determines that the wolf was not purposefully or intentionally fed or baited to a site;
	3. the permit may last for a maximum of 45 days from the date the department or USDA Wildlife Services confirms the wolf caused damage and any wolf killed within the 45 days will be counted towards the number specified on the permit;
	4. the permit expires when the total desired number of wolves are removed by the combined action of the department, USDA Wildlife Services, and individuals named on the permit, or at the end of the 45 days, whichever is first;
	5. within 24 hours, a person must report to the department killing or injuring a wolf under a permit;
	6. to preserve the physical evidence, the permittee shall leave the carcass of any wolf killed where it lay, and shall not disturb the area surrounding the carcass; and
	7. surrender the carcass to the department.
2. As allowed by 87-1-901 and 87-6-106, MCA, any person may kill without permit or license a wolf that is attacking, killing, or threatening to kill a person or livestock, or that is in the act of attacking or killing a domestic dog. A person may not intentionally bait a wolf with domestic dogs or livestock for the purpose of killing the wolf.
	1. This person shall notify the department within 72 hours, preserve the scene, leave the carcass where it was killed until the department investigates the scene, and surrender the carcass to the

department. USDA Wildlife Services will investigate and determine the cause of any injured or dead livestock.

Livestock Loss Board - The Montana Wolf Conservation and Management Plan called for creation of this Montanabased program to address the economic impacts of verified wolf-caused livestock losses. The plan identified the need for an entity independent from FWP to administer the program. The purposes of the MLLB are 1) to provide financial reimbursements to producers for losses caused by wolves based on the program criteria, and 2) to proactively apply prevention tools and incentives to decrease the risk of wolf-caused losses and minimize the number of livestock killed by wolves through proactive livestock management strategies. The Loss Mitigation element implements a reimbursement payment system for confirmed and probable losses that are verified by USDA Wildlife Services. Indirect losses and costs are not directly covered. Eligible livestock losses are cattle, calves, hogs, pigs, horses, mules, sheep, lambs, goats, llamas, and guarding animals. Confirmed and probable death losses are reimbursed at 100% of fair market value. Veterinary bills for injured livestock that are confirmed due to wolves may be covered up to 100% of fair market value of the animal when funding becomes available.

Wolf Resource Guide Wolf History Timeline

## Oregon

ODFW Non-Lethal Measures

Wolf Depredation Grant: House Bill (HB) 3560 went into effect in 2011, which directed the Oregon Department of Agriculture (ODA) to establish and implement a wolf depredation compensation and financial assistance grant program. Funds from this grant program are awarded to counties to help create and implement county wolf depredation compensation programs under which:

* Compensation is paid to persons who suffer loss or injury to livestock or working dogs due to wolf depredation.
* Financial assistance is provided to persons who implement livestock management techniques or nonlethal wolf deterrence techniques designed to discourage wolf depredation of livestock.
* Awards are paid to counties with a wolf depredation compensation program to help with implementation and administrative costs.

ODFW Information for Livestock Producers

Lethal control: The information below describes ODFW’s management rules for lethal control but these are superseded by federal rules west of Hwys 395-78-95. U.S. Fish and Wildlife Service, not ODFW, regulates any lethal take of wolves where wolves are federally listed.

Within an Area of Known Wolf Activity, an incident of depredation qualifies toward lethal control only if the landowner or lawful occupant of the land where the depredation occurred had:

* + 1. At least seven days prior to the incident of depredation, removed, treated or disposed of all intentionally placed or known and reasonably accessible unnatural attractants of potential wolf- livestock conflict, such as bone or carcass piles or disposal sites, and
		2. Prior to and on the day of the incident of depredation, been using at least one non-lethal measure ODFW deems most appropriate to protect calving operations, nursing cattle, sheep operations, or other reasonably protectable situations, not including open range situations.

In documenting the removal of unnatural attractants and implementation of conflict deterrence measures, the Department may rely upon documented personal observation and/or written statements by the owner or lawful occupant of the land to determine if an incident of depredation qualifies.

Note: The non-lethal measures referred to in this section are not mandatory. Producers may elect not to implement measures to minimize wolf-livestock conflicts. However, it is important for producers to understand that any lethal control options for ODFW will be dependent on the use of non-lethal measures and their documentation of use.

Lethal control: The information below describes ODFW’s management rules for lethal control but these are superseded by federal rules west of Hwys 395-78-95. U.S. Fish and Wildlife Service, not ODFW, regulates any lethal take of wolves where wolves are federally listed.

* + Within an Area of Depredating Wolves, an incident of depredation qualifies toward lethal control if the landowner or lawful occupant of the land where the depredation occurred had
		- Complied with the two AKWA qualification sections ((i) and (ii) above), and
		- Prior to and on the day of the incident of depredation, was implementing at least one non- lethal measure identified in the area-specific conflict deterrence plan that is specific to the location, type of livestock operation, time of the year, and/or period of livestock production associated with the depredation. In open range situations, the conflict deterrence plan measure implemented by a landowner or lawful occupant must address wolf-livestock conflict.
	+ Human presence, when used as a non-lethal measure, is presence which could reasonably be expected to deter wolf-livestock conflict under the circumstances and may be considered an appropriate non-lethal measure if it; a) occurs at a proximate time prior to and in an area proximate to a confirmed depredation as determined by ODFW, and b) indicates a timely response to wolf location information in situations of potential wolf-livestock conflict.
	+ In documenting the removal of unnatural attractants and implementation of conflict deterrence measures, the Department may rely upon documented personal observation and/or written statements by the owner or lawful occupant of the land to determine if an incident of depredation qualifies.

Note: The non-lethal measure identified in the area-specific conflict deterrence plan may, in some cases, be the same as those used within the AKWA prior to the first incident of depredation.

Silver Lake Wolves Area Conflict Deterrence Plan Rogue Pack Deterrence Plan

Oregon implements a phased system based on the number of breeding pairs present.

## Wyoming

Wolves outside the Trophy Game Management Area are now considered predatory animals as defined in state law and therefore can be harvested. Any wolf harvested in the predator zone must be reported to the Game and Fish within 10 days of harvest, this can be done by phone. Game and Fish would like to obtain a genetic sample from each harvested wolf.

WAR Section 5 - Qualifications for Funding. To qualify for funding under these rules,

1. A livestock owner, whose livestock has been injured or killed in an area in Wyoming where the gray wolf is designated as a predatory animal, and who suspects the injury or kill is from a gray wolf must:
	1. Contact USDA/APHIS/Wildlife Services (WS), or another qualified agent approved by the Director, to verify that the livestock loss or injury was due to wolf depredation; and
	2. If the livestock loss or injury is due to wolf depredation, contact the WDA Predator Management Coordinator to request assistance in managing the depredating wolf problem.
2. The WDA Predator Management Coordinator will then contact WS, or another qualified agent approved by the Director, for assistance in managing the depredating wolf problem. The WDA Predator Management Coordinator will also contact the Predator Management District President or Vice President to notify them of wolf activity in their district.
3. Through an established Memorandum of Understanding (agreement) between the ADMB and WS, or contract between the ADMB and another qualified agent approved by the Director, WS or the agent will assist the livestock owner, for a reasonable amount of time as agreed upon between WS, or the agent and the livestock owner at the time when WS, or the agent's, assistance is requested. WS or the agent will provide an invoice to the WDA for the services provided to the livestock owner.
4. Assistance in wolf management may be requested for human health and safety issues and the Director may grant funding for such assistance at his discretion.

**Section 6. Funding Distribution.** An invoice from WS or agent providing wolf management assistance shall be submitted to the WDA to request wolf management funds.

1. Initial funding shall be available for payments for wolf management. Any balance left over after the first year shall roll forward into the second year.
2. Thereafter, the WDA may annually establish a budget amount that shall be provided to reimburse, WS or approved agents of wolf management service.

**Section 2. Purpose.** The Department of Agriculture adopts the following regulations governing the distribution of funding appropriated by the Wyoming Legislature for the purpose of administering and funding damage payments to compensate landowners, lessees or their agents whose livestock as defined in W.S. §23-1-102(a) (xvi) is damaged by a gray wolf in Wyoming, in areas where the gray wolf is designated as a predatory animal. The gray wolf is designated as a predatory animal as defined in W.S.

§11-6-302(a)(ix)(B) and W.S. §23-1-101(a)(viii)(B) except in:

* 1. Those areas where gray wolves are designated as trophy game animals by W.S. §23-1-101 (a)(xii)(B)(I) and (II), and
	2. Yellowstone National Park; and,
	3. The Wind River Reservation, except on non-Indian owned fee titled lands**.**

Wolves in Wyoming Guide for Livestock Producers

“Currently, fourteen states and four Canadian provinces have government administered programs to reimburse livestock owners for losses caused by some predators. In addition, Defenders of Wildlife, a private conservation group, reimburses livestock producers for losses caused by grizzly bears in two western states and wolves in three western states…long ago the Wyoming Legislature enacted laws that waive the State’s sovereign immunity to a limited degree and accept responsibility for damage done to livestock by bears and cougars (and will do so to a limited degree for wolves in geographic locations where they are classified as trophy game animals when wolves are removed from Endangered Species Act protection). Revenues collected from application fees for limited draw big game and wild bison hunting licenses fund the current damage-claim program in Wyoming…Since 1985, in a portion of the state where cougar numbers are high, the Commission has reimbursed owners of livestock for up to the value of three missing sheep believed to have been killed by a cougar for every one sheep confirmed by the Department as having been killed by a cougar…Veterinary costs for the treatment of individual livestock that have been injured by a trophy game animal shall be considered up to a maximum amount that is not to exceed the value of the livestock injured, only in cases where a licensed veterinarian believes the individual livestock in question had a reasonable chance to survive and return to a productive state. If the individual livestock died as a result of an injury inflicted by a trophy game animal, even though the livestock received veterinary care, payment shall only be made up to a maximum of the value of the livestock.” – Bruscino and Cleveland, 2004

## Minnesota

Department of Agriculture: “Recognizing the economic harm wolf depredation can have on domestic livestock, the 1977 Minnesota Legislature authorized the Minnesota Department of Agriculture (MDA) to reimburse livestock owners for losses caused by wolves. The United States Department of Agriculture (USDA), Animal Plant Health Inspection Service, Wildlife Services provides wolf trapping for cases of verified wolf attacks on domestic animals. To receive trapping services and to be eligible for state reimbursement, farmers and ranchers need to follow specific reporting procedures.

Step 1: Carefully examine the kill site and dead livestock. Be cautious not to trample over animal tracks or disturb the site. A USDA trapper or Department of Natural Resources (DNR) conservation officer may be able to read subtle clues that you may not recognize. If the examination suggests a wild animal killed your livestock, protect your remaining animals by temporarily moving them to a more secure location, if possible.

*CAUTION : Wolves are protected under federal law. It is illegal to harm or kill a wolf, except in defense of human life. Any attempt to frighten away wolves returning to kill other animals or to feed on dead livestock must be done without harming the wolf.*

Step 2: Preserve the evidence of the suspected wolf kill as much as possible and then report the kill. To be eligible for state compensation, you must report a suspected wolf kill within 24 hours of discovery to a DNR conservation officer or USDA trapper. Make a note of who took your report and the day and time of your report for future reference.

The University of Minnesota conducted a study in early 1999 to determine if any livestock management practices could prevent wolf depredation. The study could find no management practices certain to prevent wolf depredation. The only method proven to prevent wolf depredation was removing the depredating wolves from the farm. However, farmers and ranchers have reported a few practices that may help in some cases. These include:

* Maintaining healthy, well-fed animals. Wolves typically select the weakest and easiest prey. Healthy animals are more difficult to take. Move lame or sick animals to a safe area when possible.
* Using guard animals. Although not always effective, the presence of guard dogs can be a deterrent. When using guard dogs against wolves it is important to use several dogs, as wolves may kill a single animal. Moving and consolidating sheep, as is done in rotational grazing, can help guard dogs be more effective. Keep in mind, however, that rotational grazing is less suitable during lambing as it may disrupt the bond between mother and offspring.
* Moving calving or lambing activities closer to the barnyard. Newborns are easy prey. Some farmers move calving or lambing closer to the barnyard because it allows for more frequent monitoring.”

“The state’s compensation program does not pay for missing livestock allegedly killed by wolves or for domestic dogs that are killed by wolves… However, USDA-WS has observed that non-lethal methods may work in only some situations and only some of the time. Non-lethal methods may have a short term effect and should not be viewed as an effective replacement for lethal control. The application of non- lethal methods may be more practical in the early 63 stages of wolf recovery when wolf numbers and conflicts are lower.” – Paul, 2005

## Washington

Compensation Rules for Depredation Incidents

Sheep, cattle or horses killed or injured by bears, cougars or wolves are eligible for compensation using state funds. Compensation for other animal losses depends on availability of federal or private funds.

The claimant is required to provide documentation that includes the commercial value of the lost livestock, an estimate of the percentage loss of value for the injured livestock, and a completed claim form. State law requires that only claims of $500 or more may be filed with the Department for compensation from state funds.

For confirmed depredations by wolves, the owner will be paid for verified losses on acreages of less than 100 acres. The owner will be paid an amount of twice the verified losses on acreages greater than 100 acres; payment at twice the verified losses assumes that multiple animals are missing.

For depredations caused by wolves that are classified by WDFW as “probable”, the owner will be paid for the verified loss, no matter the acreage size.

Wolf-Livestock Conflict Deterrence Updates

Washington Department of Fish and Wildlife (WDFW) works throughout the year to monitor wolf packs and help ranchers protect their livestock during the summer months. In June 2015, the WDFW Wildlife Program filed Wolf-Livestock Deterrence Updates for 15 of the state’s 16 known wolf packs,\* outlining potential risks for predation and identifying measures in place to minimize attacks on livestock.

These updates reflect WDFW’s preparations to deter conflicts between wolves and livestock during the summer of 2015:

* **WDFW Conflict Staff:** WDFW has increased the number of staff around the state to work specifically on wildlife conflict issues related to wolves. As of June, WDFW had 11 wildlife-conflict specialists working with livestock producers in areas with active wolf packs, up from eight in 2013.
* **Damage prevention cooperative agreements:** Since 2013, WDFW has offered cost-sharing arrangements to ranchers who invest in non-lethal measures (e.g. range riders, guard dogs, fladry, and carcass disposal) to protect their livestock. WDFW had 41 active agreements with livestock owners as of June 30, compared with 33 the previous year. Eleven of the current agreements are not reflected in the pack updates, because they are in areas where wolf activity has been reported but no packs have been confirmed.
* **Range riders:** WDFW has five range riders – up from three last year – under contract that wildlife managers can deploy to help ranchers monitor their livestock, remove sick and injured animals, and haze wolves away from active grazing areas. In addition, all 41 livestock owners who have signed cooperative agreements with WDFW qualify for cost-sharing arrangements for range riders.
* **Radio collars:** In the past year, 11 wolves have been captured and fitted with radio collars. There are now 14 active collars on wolves distributed among 10 of the state’s 16 known wolf packs. WDFW shares information about the location of collared wolves with qualified ranchers to help them manage their livestock.

Washington Department of Fish and Wildlife’s (WDFW) policies on such issues as:

* + **Non-lethal deterrence:** “Non-lethal management techniques will be emphasized throughout the recovery period and beyond.” (Page 85)
		- **Compensation:** “To receive compensation, producers will be responsible for following appropriate management methods that seek to limit wolf attractants in the vicinity of their livestock, including removal of dead and dying animals and other proactive measures.” (Page 91)
		- **Lethal deterrence:** “Lethal removal may be used to stop repeated depredation if it is documented that livestock have clearly been killed by wolves, non-lethal methods have been tried but failed to resolve the conflict, depredations are likely to continue, and there is no evidence of intentional feeding or unnatural attraction of wolves by the livestock owner.” (Page 88)

Checklist of non-lethal measures, tailored to specific conditions, that livestock owners must follow as a step toward qualifying for compensation for wolf depredation.

Washington DFW Wolf-Livestock Interaction Protocol

Wolf/Livestock Conflict Research – Washington State University:

Wolves are currently recolonizing Washington State. They are state-listed as endangered throughout the state and are federally listed as endangered in the western part of WA. Wolf/livestock conflicts are increasing as the wolves re-colonize their former range and increase in numbers. The purpose of this program is to minimize and mitigate wolf livestock depredations as quickly and effectively as possible while adhering to state and federal wolf recovery plans (Wiles et al. 2011). This program has two major components and six objectives:

**Research** into the

1. Underlying causes of wolf livestock depredations
2. Extent or number of wolf livestock depredations
3. Relative impact or percent mortality due to wolf livestock depredations
4. Indirect effects of wolves on livestock productivity and space-use
5. Effectiveness of non-lethal remedial measures for reducing wolf livestock depredations, and indirect effects and
6. **Outreach and Extension** of current and future research findings to livestock operators and wolf managers to minimize and mitigate wolf livestock depredations.

The investigation of non-lethal interventions will involve:

* determination of mortality rates in livestock attributable to wolves
* evaluation of non-lethal practices for deterring wolf depredation and harassment of livestock
* assessment of other impacts on livestock productivity beyond wolf predation losses

The study will encompass at least 3 (preferably 4) wintering (Nov-Jan), calving (Feb-April), and grazing seasons (May-Oct). Extensive monitoring of wolves (4 GPS locations/wolf/day) will take place throughout the wintering and calving seasons (Nov-April) and intensive monitoring (12 GPS locations/wolf/day) will take place during the grazing season (May-Oct) to allow quick examination of potential depredation sites. Extensive monitoring of cattle (4 GPS locations/cow/day) and calves (daily VHF monitoring of mortality signals) will take place throughout the calving and grazing seasons.

## Utah

Lines of Defense: Coping with Predators in the Rocky Mountain Region – Utah State Univ Can I kill a wolf that’s attacking my livestock?

The action you can take depends on two things: the attack location and the type of attack. Livestock owners and operators are authorized to kill wolves in the **delisted portion of Utah only** (the area highlighted on the map, north of I-80 and east of I-84). In this area, you may only kill a wolf under the following conditions:

* 1. When wolves are harassing, chasing, actively disturbing or harming your livestock.
	2. When wolves are in the act of killing (biting or grasping) livestock.
	3. Within 72 hours of a confirmed livestock loss. Personnel from the Utah Division of Wildlife Resources (DWR) or USDA Wildlife Services will confirm whether a wolf was responsible for the loss.

### Can I be reimbursed if a wolf kills my livestock?

Yes, but only if the predation occurs in the delisted zone (see highlighted area on map) and someone from DWR or Wildlife Services verifies that a wolf was responsible. If your livestock is killed in an area where wolves are listed as endangered, then the State of Utah cannot reimburse you. For more information, see the amended livestock damage compensation law passed by the Utah Legislature in 2010.

Wolves in Utah – Analysis of Impacts and Management Recommendations – 2002

UT Wolf Management Plan

“Strategy V: Control livestock depredation and fully compensate livestock owners for losses of livestock to wolves.

The first opportunity to avoid wolf conflicts with domestic livestock may be in prevention before conflicts occur. In some instances, non-lethal management tools can effectively address depredation concerns and are the most costeffective, least intrusive method of managing conflict. If successful, non-lethal methods may also eliminate the need for more intensive management actions later... Dealing with depredation caused by wolves is likely to remain a contentious issue among the public as management authority is given to the state and wolf populations grow. It is important to note that the goal of depredation management is to prevent losses of livestock, and not to “punish” offending wolves. That is, it is of paramount importance to keep Utah livestock producers from losing livestock by keeping wolves and livestock separate, by conditioning wolves to avoid livestock where possible, and by controlling wolves by both nonlethal and lethal means where necessary. It is further important to note that responsive management in this area is critical to wolf conservation… Livestock owners or landowners who take actions against wolves (with or without permit) will be required to report the incident within 72 hrs and an investigation will be conducted to assure the action was appropriate.”

## California

A group of students at the Bren School of Environmental Science & Management has partnered

with Defenders of Wildlife to conduct analyses of this issue, with the goal of helping California prepare to coexist with wild wolf populations through the reduction of wolf-livestock conflicts.

This project's two primary objectives were to:

1. Map wolf-livestock conflict hotspots in California, through analyses of predicted gray wolf habitat and current livestock grazing land, and
2. Recommend non-lethal conflict reduction strategies to implement near active range lands and livestock operations in Northern California.

**1st objective:** we mapped the state's wolf habitat (top right) through statistical analysis of

the environmental variables associated with its landscape. We then compared this to a map of livestock grazing in order to identify "conflict hotspot" zones (bottom right). Those hotspots are where we should implement practices to reduce wolf-livestock conflicts.

**2nd objective:** we surveyed 124 livestock producers in the state's 7 northernmost counties (Shasta, Lassen, Modoc, Siskiyou, Del Norte, Humboldt and Trinity counties). Survey responses indicated which conflict reduction practices are able to be implemented on those producers' lands. Combined, they reported that ***attractant removal*** and ***range riding*** are the most locally feasible practices.

We are sharing our results with stakeholders around the state and hope this information helps them adopt successful, cost-effective solutions to the problem.

From Dan Macon et al.:

Good afternoon! UCCE advisors and specialists are working on a comprehensive number of projects directly related to human-wildlife conflict, including wolves, throughout northern California. We’ve also been working in close partnership with CDFW, producer organizations, and other stakeholders on these topics.

1. In 2018, we published a peer-reviewed guide to livestock protection tools (go to https://anrcatalog.ucanr.edu/pdf/8598.pdf to view the publication). This publication has been provided to ranchers, agency staff, NGOs and others with an interest in the topic.
2. We are leading a collaborative effort within UC to study the impacts (both direct and indirect) from predators (including wolves) on ranching operations in Northern California. This is a 10-year study, with more than 100 ranchers participating.
3. In the spring of 2019, we will be holding 5 rancher field days designed to demonstrate livestock protection tools in on-ranch settings. These field days will be held in each of the counties that currently have had reports of wolf presence (Nevada, Sierra, Plumas, Sierra, Lassen, Modoc and Siskiyou).
4. In the late spring or summer of 2019, we will hold an on-ranch field day on livestock protection tools for agency staff and leadership. We will certainly keep you posted about the details of this workshop.
5. UC Rangelands has established a Livestock-Predator Information Hub on the UC Rangelands Website. This page includes links to current research, information about our producer survey, and additional resources regarding livestock-predator interactions. You can view the hub at [http://rangelands.ucdavis.edu/predator-hub/.](http://rangelands.ucdavis.edu/predator-hub/)

California Wolf-Livestock and Wolf Conservation Stakeholder Subgroups Meeting 11.4.2014

## Federal

USFW Wolf Livestock Demonstration Project Grant Program – grants to fund projects and compensation funds.

Eligible Applicants:

WLDPGP funds will be allocated competitively directly to States and tribes through grants. The selected States and tribes will establish their own procedures for accepting applications from private entities (including individual ranchers, for-profit corporations, and not-for-profit corporations) interested in

obtaining WLDPGP funds. Individuals or corporations seeking funds will need to work through the procedures established by their State or tribal wildlife management/animal damage control agency.

To be eligible to receive a grant, a State or tribe must:

1. designate an appropriate agency of the State or tribal government to administer one or both aspects of the program funded by the grant;
2. establish one or more accounts to receive grant funds;
3. maintain files of all claims received under programs funded by the grant, including supporting documentation;
4. submit to the Service’s Regional Program Coordinator (see Table 2, Section VII)
	1. annual reports that include—
5. a summary of claims and expenditures under the program during the year; and
6. a description of any action taken on the claims; and
	1. such other reports as the Secretary may require to assist in determining the effectiveness of activities provided assistance under this program (described below under

VI. Award Administration Information); and

1. promulgate rules for reimbursing livestock producers under the program, for: Depredation Compensation Grants:
* Commitment to ensure proper documentation, retain receipts, and records of matching funds expended.
* Ability to protect the evidence of depredation.
* Coordination with local United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS)-Wildlife Services field representatives, or other authorized official, who will coordinate an investigation.
* Documentation to ensure payments of fair-market value.

## Scientific Literature

Effects of Wolf Mortality on Livestock Depredations - 2014

“Our results do not support the “remedial control” hypothesis of predator mortality on livestock depredations the following year. However, lethal control of wolves appears to be related to increased depredations in a larger area the following year. Our results are supported by the findings of Harper et al. (2008) in Minnesota where they found that across the state (large scale) none of their correlations supported the hypothesis that killing a high number of wolves reduced the following year's depredations… However, contrary to the “remedial control” hypothesis, each additional wolf killed increased the expected mean number of livestock depredated by 5–6% for cattle and 4% for sheep. It appears that lethal wolf control to reduce the number of livestock depredated is associated with increased, not decreased, depredations the following year, on a large scale – at least until wolf mortality exceeds 25%. Why 25%?

The observed mean intrinsic growth rate of wolves in Idaho, Wyoming, and Montana is about 25% [21]. Therefore, once anthropogenic mortality exceeds 25%, the numbers of breeding pairs and wolves must decline – resulting in fewer livestock depredations.”

Adaptive use of nonlethal strategies for minimizing wolf–sheep conflict in Idaho - 2017

“A variety of nonlethal methods have proven effective in reducing livestock losses to wolves in small-scale operations but in large-scale, open-range grazing operations, nonlethal management strategies are often presumed ineffective or infeasible. To demonstrate that nonlethal techniques can be effective at large scales, we report a 7-year case study where we strategically applied nonlethal predator deterrents and animal husbandry techniques on an adaptive basis… Over the 7-year period, sheep depredation losses to wolves were 3.5 times higher in the Nonprotected Area (NPA) than in the Protected Area (PA).

Furthermore, no wolves were lethally controlled within the PA and sheep depredation losses to wolves

were just 0.02% of the total number of sheep present, the lowest loss rate among sheep-grazing areas in wolf range statewide, whereas wolves were lethally controlled in the NPA.”

Wolf-Livestock Conflict and Effects of Wolf Management - 2017

“There is some evidence to suggest that livestock depredations are a learned behavior by particular wolves, who become more likely to target livestock after an initial event…We found no evidence that removing wolves through public harvest affected the year-to-year presence or absence of livestock depredations by wolves. In other words, public harvest did not effectively turn off depredations in areas with reoccurring conflict. However, we did find evidence that public harvest of a greater proportion of the known wolves in a district reduced the number of depredations, within the subset of districts with conflicts… Increasing levels of targeted lethal removal of wolves following depredations reduced the probability of their recurrence (Fig. 5), which mirrored results of another recent study at the scale of individual wolf packs (Bradley et al. 2015). Although targeted removals did not appear to significantly affect the frequency of depredations in places where they did reoccur, it seemed the primary effect was in reducing the probability that any depredation event occurred…”

Non-Lethal and Lethal Tools to manage Wolf-Livestock Conflict in NW US – 2006

“A variety of tools, including regulations that empower the local public to protect their private property, reduced the probability of wolf-caused damage. This wolf population was restored, the risk of livestock damage reduced, and public tolerance of wolves improved through an integrated program of proactive and reactive non-lethal and lethal control tools. Reduced conflict increases the potential to restore wolf populations.”

Great summary of tools used including the theory behind them, advantages, and drawbacks.

People, Predators, and Perceptions: Patterns of Livestock Depredation – 2013

“In the case of wolves, the ruggedness of the pastures used by herded stock was the most important factors influencing actual livestock depredation. This relationship between structural complexity of the habitat and the extent of livestock depredation by wolves was negative. This is consistent with the expectation that a cursorial carnivore would prefer structurally less complex habitat.”

Killing Wolves to Prevent Predation on Livestock May Protect One Farm, But Harm Neighbors – 2018 “We retrospectively evaluated whether lethal interventions by the State of Michigan in response to wolf predation on domestic animals (depredations) between 1998–2014 resulted in lower risk of recurrence of depredations than if no wolves were killed. We found the delay to recurrence of depredations was unrelated to the number of wolves killed at all spatial scales. We found lethal management did not significantly shorten or lengthen the interval to the next depredation relative to non-lethal interventions. A small, statistically insignificant reduction in the risk of depredation at the section level was offset by a similar and also statistically insignificant increase in the risk of depredation at the township scale, which is about half the size of a wolf pack territory, and then a similar decrease in risk at the scale of neighborhoods of townships, which are four times larger than the average wolf pack territory [30]. None of these differences were statistically significant using a battery of tests… Overall, our analysis suggests that any potential beneficial effects of lethal interventions locally would be offset by detrimental effects for neighboring farms in the same township… Lethal interventions by the State of Michigan against wolves in the vicinities of verified livestock losses did not appear to reduce future losses. We view our findings as preliminary pending experiments with stronger inference.”

Effects of Wolves on Elk and Cattle Behaviors – 2010

“Our findings that cattle moved closer to other cattle and increased path sinuosity (Table 1) may suggest that cattle form groups in the presence of wolves. Grouping is used by prey to dilute predation risk among individuals in the group and increase group vigilance (the many-eyes hypothesis [56]) so prey have more time to spend grazing… Finally, cattle might show variability in responses because of lack of experience with predators when compared to wild prey species that live with predators year-round. In addition, in our study monitored cattle were yearling animals that had been separated from their mothers… The variable

behavioral responses to predators that we found in cattle might have fitness costs. For example, predation can increase the stress levels of animals and result in reduced reproduction… Lind and Cresswell [62] suggested that where the cost of anti-predation behavior is higher, as in naïve prey for example, then we may reasonably conclude that anti-predation behavior affects health and fitness of prey… Our results suggest wolves influence cattle behaviour but we did not measure subsequent fitness costs (whether mediated by stress, changes in forage intake, or something else)… Financial compensation for livestock killed by wolves is a tool used to promote tolerance for wolves in many areas where wolves kill livestock [1]. However, many current compensation programs for livestock depredation by wolves only compensate for the costs of direct predator effects (i.e., killed livestock) [74], [75]. In most jurisdictions behavioral effects of wolf presence on livestock are not officially acknowledged, so no compensation is provided for these. The effectiveness of compensation programs is debated [76], however, they could potentially be improved by compensating for the non-consumptive effects of wolves on prey, such as those that we documented and could not quantify. ”

Policy Issues Related to Wolves in the Northern Rocky Mountains