

## 2017 Effectiveness Monitoring Committee Themes and Critical Monitoring Questions

During the development of critical monitoring questions the EMC summarized the monitoring questions into eleven individual themes. The themes listed below are in no particular order.

### Theme 1: WLPZ Riparian Function

The FPRs have been developed to ensure that timber operations do not potentially cause significant adverse site-specific and cumulative adverse impacts to the beneficial uses of water, native aquatic and riparian-associated species, functions of riparian zones or result in an unauthorized take of listed aquatic species (14 CCR § 916 [936, 956]). The primary objective of the Watercourse and Lake Protection Zone (WLPZ) FPRs is to maintain or restore riparian and aquatic functions in classified watercourses. This can occur with both passive and active management approaches that may incorporate options ranging from protection (passive no touch) to active manipulation of stand structure and include timber harvest (14 CCR § 916.9 [936.9, 956.9](v)). Key functions of riparian zones include large wood recruitment, watercourse shading, sediment filtration, nutrient input, microclimate control, streambank/hillslope stability, and habitat for terrestrial wildlife species. The WLPZ FPRs can contribute toward meeting goals of Fish and Game Commission (FGCom) and/or FGCom and Board (Joint) policies, including: Endangered and Threatened Species Policy, Salmon Policy, Water Policy, and Joint Pacific Salmon and Anadromous Trout Policies. Riparian areas occur dynamically within watersheds adjusting to successional vegetation changes and annual hydrologic events and other disturbances (e.g., wildfires, wind, insect, diseases). In addition, the WLPZ FPRs may also contribute toward meeting Basin Plan objectives. Accordingly, the following critical questions should focus on the natural processes and function of WLPZs and have allowances for the dynamic nature of these management areas.

#### Critical Questions:

Are the FPRs and associated regulations effective in ...

- (a) maintaining and restoring canopy closure?
- (b) maintaining and restoring stream water temperature?
- (c) retaining predominant conifers in WLPZs and large woody debris input to watercourse channels?
- (d) retaining conifer and deciduous species to maintain or restore riparian shade, water temperature, and primary productivity?
- (e) maintaining and restoring input of organic matter to maintain or restore primary productivity as measured by macroinvertebrate assemblages?  
*(Note: Monitoring may also be appropriate for the AB1492 Working Groups).*
- (f) maintaining and restoring riparian function of Class II-L watercourses in the Coast District?
- (g) maintaining and restoring riparian function of Class II-L watercourses in the Northern District?
- (h) managing WLPZs to reduce or minimize potential fire behavior and rate of spread?
- (i) filtering sediment that reaches WLPZs?

## Theme 2: Watercourse Channel Sediment

Since the implementation of the modern FPRs in 1975, a primary goal of these regulations has been to limit the delivery of management-related sediment to watercourse channels in California. The amount of hillslope erosion and sediment delivery that occurs following timber operations depends on numerous factors, including the site conditions present (e.g., slope, soil type, vegetative cover), soil disturbance, level of proper FPR implementation, and intensity and number of large storm events following the completion of logging. The FPRs have been upgraded numerous times in the past 40 years to reduce management-related sediment delivery. Specifically, current silviculture practice regulations (14 CCR § 913 [933, 953]), harvesting practices and erosion control measures (14 CCR § 914 [934, 954]), watercourse and lake protection (14 CCR § 916 [936, 956]) and logging roads, landings and logging road watercourse crossings rules (14 CCR § 923 [943, 953]) provide measures to ensure timber operations meet the goals and intent of the FPRs by limiting sediment delivery to stream channels. These FPRs can contribute toward meeting goals of FGCom and/or FGCom and Board (Joint) policies that address protection of water quality and fish habitat, including the Endangered and Threatened Species, Salmon, Water, and Joint Pacific Salmon and Anadromous Trout Policies. In addition, these FPRs may also contribute toward meeting Basin Plan objectives. The critical questions for Theme 2 address erosion and sediment monitoring at both the watershed (or sub-watershed) scale and Plan scale.

### Critical Questions:

Are the FPRs and associated regulations effective in minimizing management-related sediment delivery from forest management activities to watercourse channels ...

- (a) at the watershed and sub-watershed level in managed watersheds?
- (b) for individual Plans at the project level to evaluate channel response to forest management prescriptions and additional mitigation measures?

*(Note: Monitoring may also be appropriate for the AB 1492 Working Groups)  
(see Section 4.3 for discussion of appropriate scale(s)).*

## Theme 3: Road and WLPZ Sediment

Similar to Theme 2, the Road and WLPZ Sediment theme has been developed to answer critical questions regarding management-related hillslope erosion and sediment delivery to watercourse channels in forested watersheds. Theme 3 focuses on critical questions related to the effectiveness of FPR requirements included in the recently implemented Road Rules 2013 requirements (14 CCR § 923 [943, 953]). These FPRs also contribute toward meeting goals of FGCom and/or FGCom and Board (Joint) policies that address protection of water quality and fish habitat listed above. In addition, these FPRs may also contribute toward meeting Basin Plan objectives.

### Critical Questions:

Are the FPRs and associated regulations effective in ...

- (a) reducing or minimizing management-related generation of sediment and delivery to watercourse channels?
- (b) reducing generation and sediment delivery to watercourse channels when timber operations implement the Road Rules 2013 measures?
- (c) reducing the effects of large storms on landslides as related to roads, watercourse crossings and landings?

- (d) maintaining or improving fish passage through watercourse crossing structures?  
(see Section 4.3 for discussion of appropriate scale(s))

#### **Theme 4: Mass Wasting Sediment**

To limit mass wasting sediment from anthropogenic sources, the FPRs require that timber operations be planned and conducted to provide mitigation measures to minimize sediment delivery from unstable geologic features (14 CCR § 923 [943, 953]). While considerable past monitoring efforts have addressed implementation and short-term effectiveness of FPRs designed to limit sediment entry related to surface erosion processes, less documentation has occurred on a statewide basis for success of the FPRs in preventing accelerated rates of management-related mass wasting features. This is particularly important in the California Coast Ranges and Klamath Mountains, where landslide features can be the primary sediment delivery mechanism. Achieving this goal is consistent with the goals of FGCom and/or FGCom and Board (Joint) policies, including the Endangered and Threatened Species, Salmon, Water, and Joint Pacific Salmon and Anadromous Trout Policies. In addition, these FPRs may also contribute toward meeting Basin Plan objectives. The critical questions for this theme address specific mass wasting-related topics to determine if the current rules and regulations are effective in avoiding and reducing management-induced landsliding.

##### **Critical Questions:**

Are the FPRs and associated regulations effective in minimizing sediment delivery to maintain water quality from ...

- (a) existing chronic unstable geologic features?
- (b) mass wasting during episodic rare events and/or large storms (see Section 4.3.1)?
- (c) mass wasting from high risk geologic features?

#### **Theme 5: Fish Habitat**

Numerous FPR regulations relate to the protection of fish habitat features in forested watersheds, particularly those found in the WLPZ rule section [14 CCR § 916 (936, 956)]. Specifically, these FPRs require that timber operations shall be planned and conducted to provide protection for water temperature control, streambed and flow modifications by large woody debris, filtration of organic and inorganic material, upslope stability, bank and channel stabilization, and spawning and rearing habitat for salmonids [14 CCR § 916.4 (936.4, 956.4) (b)]. As stated above for the other themes, these rule requirements contribute toward meeting the goals of FGCom and/or FGCom and BOF (Joint) policies, including: Endangered and Threatened Species Policy, Salmon Policy, Water Policy, and Joint Pacific Salmon and Anadromous Trout Policy. In addition, these FPRs may also contribute toward meeting Basin Plan objectives. The critical questions included under this theme relate to maintaining and/or restoring the quality and connectivity of foraging, rearing, and spawning habitat.

##### **Critical Questions:**

Are FPRs and associated regulations effective in ...

- (a) describing and mapping the distribution of foraging, rearing and spawning habitat for anadromous salmonids?
- (b) maintaining and restoring the distribution of foraging, rearing and spawning habitat for anadromous salmonids?

(Note: Monitoring may also be appropriate for the AB1492 Working Groups).

## Theme 6: Wildfire Hazard

A goal of the FPRs is the production and maintenance of forests which are healthy and naturally diverse (14 CCR § 897). Numerous studies have shown that creating these types of forests reduces the risk of high severity wildfire (Safford et al. 2012, North et al. 2009, Omi and Martinson 2004, Martinson and Omi 2003). Several FPR sections address this wildfire hazard reduction theme, including minimum stocking standards (14 CCR § 912.7 [932.7, 952.7]), special silvicultural methods and stocking requirements (14 CCR § 961), silvicultural objectives and regeneration methods (14 CCR § 913 [933, 953]), logging slash and hazard reduction (14 CCR § 917 [937, 957]), exemptions which facilitate removal of dead, dying or diseased trees (14 CCR § 1038), emergency notices which also facilitate removal of burned, dead, dying or diseased trees (14 CCR § 1052) and fuel hazard reduction (14 CCR § 1051). All of these rule sections provide measures to ensure timber operations meet the goals and intent of the FPRs. These FPRs appear to contribute toward meeting the goals of FGCom or Joint FGCom and Board policies, including: Endangered and Threatened Species Policy, Salmon Policy, Water Policy, Joint Pacific Salmon and Anadromous Trout Policy, and Interim Joint Policy on Pre, During and Post Fire Activities and Wildlife Habitat. In addition, these FPRs may also contribute toward meeting water quality standards. To date, little effectiveness monitoring related to this theme has occurred on a statewide basis. The following critical questions address specific topics related to wildfire hazard reduction. This theme has been further bolstered and brought to the forefront of immediate concerns, due to widespread and increasingly destructive nature of wildland fires within the state. Governor Brown Jr. had decreed via executive order, for the formation of the California Forest Management Task Force<sup>1</sup> (formerly: Tree Mortality Task Force) whose foundation is built on guiding land management into creating healthier and more fire-resilient landscapes.

### Critical Questions:

Are the FPRs and associated regulations effective in ...

- (a) treating post-harvest slash and slash piles to modify fire behavior?
- (b) treating post-harvest slash and retaining wildlife habitat structures, including snags and large woody debris?
- (c) managing fuel loads, vegetation patterns and fuel breaks for fire hazard reduction?

## Theme 7: Wildlife Habitat: Species and Nest Sites

The FPRs have a stated goal to maintain functional wildlife habitat in sufficient condition for continued use by the existing wildlife community within the planning watershed (14 CCR § 897). More specifically the FPRs require that timber operations shall be planned and conducted to maintain suitable habitat for wildlife species (14 CCR § 919 [939, 959]) and protection of nest sites (14 CCR § 919.2 [939.2, 959.2]). Reaching this goal appears consistent with the goals of FGCom or Joint FGCom and Board policies, including: Endangered and Threatened Species Policy and the Raptor Policy. Similar to Themes 4 and 6, extensive effectiveness monitoring on a statewide basis has not been conducted on non-federal

---

<sup>1</sup> Governor Edmund G. Brown, Jr. *Executive Order B-52-18*. State of California: Office of the Governor. May 10, 2018. <https://www.gov.ca.gov/wp-content/uploads/2018/05/5.10.18-Forest-EO.pdf>.

timberlands for this or the following wildlife habitat themes. The critical questions that follow address wildlife habitat requirements related to species and nest sites.

### **Critical Questions:**

Are the FPRs and associated regulations effective in protection of nest sites ...

- (a) following general protection measures in 14 CCR § 919.2 [939.2, 959.2](b)?
- (b) following species specific habitat and disturbance measures in 14 CCR § 919.3 [939.3, 959.3]?

Are the FPRs and associated regulations effective for the northern spotted owl in ...

- (a) ensuring take avoidance following 14 CCR § 919.9 [939.9] and 14 CCR § 919.10 [939.10]?
- (b) ensuring take avoidance following 14 CCR § 919.9 [939.9](g)?
- (c) maintaining adequate amounts of suitable habitat to protect and conserve owls?

*(Note: Monitoring (c) may also be appropriate for the AB 1492 Working Groups).*

## **Theme 8: Wildlife Habitat: Seral Stages**

The Wildlife Habitat: Seral Stages theme has been developed to answer critical questions about the effectiveness of the FPRs in maintaining functional wildlife habitat [14 CCR §§ 897; 919 [939,959]], and in particular late seral stage retention. The FPRs require the Registered Professional Forester (RPF) to provide habitat structure information for late succession forest stands proposed for harvesting that will significantly reduce the amount and distribution of late succession forest stands or their functional wildlife habitat value so that it constitutes a significant adverse impact on the environment as defined in Section 895.1 (14 CCR § 919.16 [939.16, 959.16]). Additionally, Technical Rule Addendum No. 2 provides specific guidance that the assessment of biological habitat conditions should consider: snags and den trees, down, large woody debris, multistory canopy, road density, hardwood cover, late seral forest characteristics and late seral habitat continuity (14 CCR § 912.9 [932.9, 952.9]). These FPRs appear to contribute toward reaching the goals of FGCom policies, including: Endangered and Threatened Species Policy and Raptor Policy. The following critical questions address wildlife habitat requirements related to seral stages.

### **Critical Questions:**

Are the FPRs and associated regulations effective in ...

- (a) retaining and recruiting late and diverse seral stage habitat components in WLPZs for wildlife?
- (b) maintaining or increasing the amount and distribution of late succession forest stands for wildlife?
- (c) maintaining or recruiting adequate amounts of early- and mid-seral habitats?

*(Note: Monitoring may also be appropriate for the AB 1492 Working Groups)*

## **Theme 9: Wildlife Habitat: Cumulative Impacts**

Theme 9 has been included to specifically address cumulative impacts and wildlife habitat. The FPRs require that timber operations shall be planned and conducted to maintain suitable habitat for wildlife species (14 CCR § 919 [939, 959]). Also, the FPRs require a Cumulative Impacts Assessment (14 CCR §

898) to be completed that includes, but is not limited to, the overall biological habitat condition within both the plan and planning area. Technical Rule Addendum No. 2 provides specific guidance that the assessment of biological habitat conditions should consider: snags and den trees, down, large woody debris, multistory canopy, road density, hardwood cover, late seral forest characteristics and late seral habitat continuity (14 CCR § 912.9 [932.9, 952.9]). With respect to terrestrial species and their habitats, these FPRs appear to contribute toward reaching the goals of FGCom policies, including: Endangered and Threatened Species Policy and Raptor Policy. The critical questions that follow address cumulative biological resources-related questions.

#### **Critical Questions:**

Are the FPRs and associated regulations effective in ...

- (a) characterizing and describing terrestrial wildlife habitat and ecological processes?
- (b) avoiding significant adverse impacts to terrestrial wildlife species?

*(Note: Monitoring for (a) may also be appropriate for the AB 1492 Working Groups).*

### **Theme 10: Wildlife Habitat: Structures**

As stated for the other wildlife habitat themes above, a major goal of the FPRs is to maintain functional wildlife habitat in sufficient condition for continued use by the existing wildlife community within the planning watershed (14 CCR § 897). The FPRs require that timber operations shall be planned and conducted to maintain suitable habitat for wildlife species (14 CCR § 919 [939, 959]), and to encourage retention of structural elements or biological legacies through the implementation of Variable Retention (VR) silviculture (14 CCR § 913.4 [933.4, 953.4] (d)). With respect to terrestrial species and their habitats, these FPRs appear to contribute toward reaching the goals of FGCom policies, including: Endangered and Threatened Species Policy and Raptor Policy. Critical questions have been developed to determine if the FPRs are effective in maintaining a proper level of structure required for wildlife habitat.

#### **Critical Questions:**

Is Variable Retention silviculture effective in meeting ...

- (a) ecological objectives including co-benefits?
- (b) social objectives?
- (c) geomorphic objectives?

Are the FPRs and associated regulations effective in retaining ...

- (a) a mix of stages of snag development that maintain properly functioning levels of wildlife habitat?
- (b) native oaks where required to maintain wildlife habitat (14 CCR § 959.15)?

### **Theme 11: Hardwood Values**

Hardwoods are valued as ecological, economic, and cultural resources. For the purposes of this Theme, the term hardwoods refers to trees within timberland that are not conifers, both Commercial Species and non-commercial species, including but not limited to: tanoak (*Notholithocarpus densiflorus*), true oaks (*Quercus* spp.), alders (*Alnus* spp.), Pacific madrone (*Arbutus menziesii*), California bay (*Umbellularia californica*), golden chinquapin (*Chrysolepsis chrysophylla*), and aspen and cottonwoods

(*Populus* spp.). The FPRs recognize hardwood ecological values in the Appendix to Technical Rule Addendum No. 2, wherein Hardwood Cover is recommended as a significant biological factor for a cumulative impacts assessment. More generally, the FPRs state that while growing trees for high quality timber, “the goal of forest management...shall be the production or maintenance of forests which are healthy and *naturally diverse*, with a *mixture of trees* and under-story plants [emphasis added]...” (14 CCR § 897 (b)(1)). The FPRs also have special prescriptions and exemptions from normal Plan preparation for the purposes of restoring hardwood stands (14 CCR § 913.4 [933.4, 953.4] (e), (f); § 1038 (l) [recently approved by the Board of Forestry]). Additionally, the FPRs identify hardwoods as an important component of riparian vegetation in the WLPZ (14 CCR 916 [936, 956]). With respect to hardwoods, these FPRs appear to contribute toward reaching the goal of the Joint FGCom and Board Policy on Hardwoods. Critical questions have been developed to determine if the FPRs are effective in maintaining and restoring hardwoods on timberland.

### **Critical Questions:**

Are the FPRs and associated regulations effective in retaining...

- (a) diverse forests with a mixture of tree species that includes hardwoods (14 CCR § 897 (b)(1))?
- (b) native oaks where required to maintain wildlife habitat (14 CCR § 959.15)?
- (c) aspen stands (14 CCR § 913.4 [933.4, 953.4] (e))?
- (d) California black oak (*Quercus kelloggii*) and Oregon white oak (*Quercus garryana*) woodlands (14 CCR § 913.4 [933.4, 953.4] (f); § 1038 (l))?