

FORPRIEM ver. 2.0 Project Description

February 8, 2016

Background Information and Problem Statement

FORPRIEM ver. 2.0 is a continuation of the FORPRIEM (Forest Practice Rules Implementation and Effectiveness Monitoring) program began in 2008 (Brandow and Cafferata 2014), which itself was a continuation of earlier BOF/CAL FIRE monitoring programs (Modified Completion Report (MCR) monitoring—Brandow et al. 2006, and the Hillslope Monitoring Program (HMP)—Cafferata and Munn 2002). All of these programs were used to determine the adequacy of the implementation and short-term effectiveness of California’s Forest Practice Rules developed to protect water quality and riparian/aquatic habitats.

These state-sponsored monitoring programs have yielded considerable data during the past two decades: HMP--1996 through 2001, MCR--2001 through 2004, and FORPRIEM—2008 through 2013. The results from these studies, using comparable data collection and sampling methods, have been generally similar. They have found that (1) individual practices required by the California FPRs are usually effective in preventing hillslope erosion when properly implemented, and (2) overall rule implementation rates are high (approximately 90% or higher depending on the rule section). For example, only approximately 5% of the forest road drainage structures located on randomly located road segments have been found to have problems.

Road drainage, including at watercourse crossing approaches, has been found to need improvement, as has watercourse crossing design, construction, maintenance, and abandonment. The data from these monitoring programs suggest that there may be improvement over time for both watercourse crossing rule implementation and effectiveness, as well as for Class I WLPZ total canopy. The expectation is that with the implementation of the Road Rules, 2013 and Anadromous Salmonid Protection (ASP) rule packages, these trends will continue, and improvement in road drainage at watercourse crossing approaches will be observed. FORPRIEM ver. 2.0 will provide important data to the Board’s Effectiveness Monitoring Committee (EMC) to determine if these improvements are indeed observed, or if further refinements in the FPRs are needed.

The original mandate for FPR implementation and effectiveness monitoring related to water quality came from the desire to have the California Forest Practice Rules certified by US EPA as Best Management Practices (BMPs) under Section 208 of the Federal Clean Water Act. While that has not happened to date, the expectation to continue monitoring is high—particularly due to state and federal anadromous salmonid species listings, listing of waterbodies as impaired under Section 303(d) of the Federal Clean Water Act, and stakeholder concerns voiced to the Board of Forestry and Fire Protection (BOF). FORPRIEM monitoring is CAL FIRE’s only direct ‘project monitoring’ of THPs and NTMPs, except for Forest Practice inspections, and remains a very high priority for the Department.

Additionally, the Road Rules, 2013 rule package includes the following two monitoring requirements:

Maintenance and Monitoring of Logging Roads and Landings

14 CCR §§ 923.7 [943.7, 963.7] (k) . . . The Department shall also conduct monitoring inspections at least once during the prescribed maintenance period to assess logging road and landing conditions.

Watercourse Crossings

14 CCR §§ 923.9 [943.9, 963.9] (u) . . . The Department shall also conduct monitoring inspections at least once during the prescribed maintenance period to assess watercourse crossing conditions.

It is the EMC's intent that if FPR monitoring requirements are consistent with the monitoring themes identified in Section 2.3 of its Strategic Plan, the EMC will place significant emphasis on them, ensuring that they are addressed with EMC-supported monitoring projects.¹ It is important to note that gathering input from the BOF's Effectiveness Monitoring Committee on revisions to FORPRIEM and making an attempt to better utilize all Review Team agencies to collect field data are key components of FORPRIEM ver. 2.0. Primary collaborating agencies, in addition to CAL FIRE, are NCRWQCB, CVRWQCB, CGS, CDFW. Data collected as part of FORPRIEM ver. 2.0 will complement data collected for other EMC monitoring projects (e.g., EMC-2015-004).

Selected Specific Monitoring Questions²

1. WLPZs
 - a. Are Class I, II, and III watercourse rules being properly implemented, including overstory, understory, and total canopy requirements, ground cover requirements, WLPZ widths, etc.?
 - b. Are Class I WLPZ post-harvest canopy levels continuing to improve over time?
 - c. For a subset of sites, determine if canopy measurements made with a sighting tube compare favorably to those made with hemispherical photography (Danehy et al. 2005).
 - d. Are there erosion features within Class I or II WLPZs, and Class III ELZs that are related to the current timber harvesting operations?
 - e. Are THP/NTMP mitigation measures specified for WLPZs beyond the standard FPRs properly implemented and effective in preventing erosion and sediment delivery?

¹ These rule requirements are consistent with Section 2.3, Themes 1, 2, 3, and 4.

² WLPZs, road segments, and watercourse crossings will continue to be randomly located within plans, as has occurred with past monitoring programs. Other high risk portions of harvest plans may also be added depending on agency priorities. Plans will also be randomly selected, based on a stratified random selection process described on page 3. Short-term effectiveness will continue to be evaluated following at least one over wintering period.

2. Roads

- a. Are the Road Rule, 2013 rule package requirements being properly implemented, including hydrologic disconnection?
- b. Are road drainage structures and facilities constructed and maintained at proper spacing, sufficient to prevent road erosion features on the road surface and fill slopes?
- c. Are road erosion features delivering sediment beyond the toe of the fill, to the WLPZ, or to the high water channel? If so, were the road FPRs properly implemented at this site?
- d. Are THP/NTMP mitigation measures specified for roads beyond the standard FPRs properly implemented and effective in preventing erosion and sediment delivery?

3. Watercourse Crossings

- a. Are watercourse crossings (including culverts, fords, and bridges) designed, constructed, maintained, and abandoned as per requirements in the Road Rules, 2013 rule package?
- b. Are the Road Rule, 2013 rule requirements for watercourse crossings effective in protecting water quality (short-term effectiveness)?
- c. Are watercourse crossing effectiveness categories (e.g., diversion potential, plugging, alignment) improving over time compared to results from prior monitoring programs?
- d. Are THP/NTMP mitigation measures specified for watercourse crossings beyond the standard FPRs properly implemented and effective in preventing erosion and sediment delivery?

Stratified Approach for Plan Selection

The approach will be to develop a methodology for a stratified random sample of completed THPs and NTMP-NTOs to better test the FPRs on a larger percentage of higher erosion risk sites. The current plan is to use the following ArcGIS layers to assess erosion risk:

- 10 m DEM slope (index for shallow landsliding)
- Deep seated landslide susceptibility layer (Wills et al. 2011)
- E-EHR (surface erosion hazard) [note incomplete soil survey data in Calaveras and Humboldt counties at this time] (program currently available from CAL FIRE GIS Program, Santa Rosa)
- Drainage density (National Hydrology Dataset)

A simple algorithm will be developed to combine these parameters for a composite score, similar to that used by McKittrick (1994) to rate erosion potential for super planning watersheds in California (Table 1). A sensitivity analysis is being performed to determine how important vegetation cover is in the E-EHR methodology (i.e., assume 100% cover for all areas, vs lower percent cover for different silvicultural systems). The erosion risk procedure will be beta tested by CAL FIRE GIS and Watershed Protection Program staff. When the working group is satisfied with the algorithm and the modeling results it produces, it will be vetted through the EMC to the Review Team agencies and the public. After a stratification scheme is developed for higher risk plans, the ArcGIS

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THP layer and a randomization scheme will be used to select the appropriate number of plans in each risk category (high, medium, and low)—allowing an adequate relationship to the total plan population to be generated.

Subsequent FORPRIEM ver. 2.0 Tasks

- Integrate lessons learned in the HMP, MCR, IMMP (Longstreth et al. 2008), BCTF (BCTF 2011), and FORPRIEM projects into FORPRIEM 2.0.
- Redesign the FORPRIEM field forms to collect data meaningful to all the agencies, as well as addressing the newer BOF rule package requirements (ASP rules, Road Rules, 2013, etc.).
- Investigate methods for electronic field data entry—using smart phones and Survey 123 or similar applications, and/or tablets.
- Learn how to collect WLPZ canopy data with hemispherical photography.
- Investigate and develop procedures to selected monitoring sites by hillslope position (i.e., toe, midslope, ridgetop).
- Develop a spatially explicit database for data storage.
- Develop a methodology manual and training program for all Review Team agencies, so as to more fully integrate CGS, DFW, and RWQCB staff in data collection.
- Develop a detailed QA/QC program simultaneously with the main plan sampling program.

Updated Timeline

The goal is to finish the draft methods document in spring 2016, beta test the revised procedures in summer 2016, schedule training sessions in late 2016, and implement the program by the end of 2016. Data collection is anticipated to occur for a minimum of 3-5 years.

Funding

No additional funding is required from the EMC; CAL FIRE will provide staff to collect data. It is anticipated that with AB 1492 funded positions in place, the other Review Team agencies will also assist in field data collection, as well as other aspects of the project.

Table 1. Potential rating scheme for determining high risk plans.

Category	High	Moderate	Low
Slope (%)	>60 (3)	30-59 (2)	<30 (1)
Erosion Hazard Rating	>66 (3)	50-65 (2)	<50 (1)
Deep-Seated Landslide Rating	8 to 10 (3)	5 to 7 (2)	0 to 3 (1)
Drainage Density (mi/mi ²)	xx (3)	xx (2)	xx (1)
	High	Moderate	Low
Planning Watershed Rating	10 to 12	6 to 9	4 to 5

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