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1 **EFFECTIVENESS MONITORING COMMITTEE (EMC)**  
2 **Strategic Plan**  
3



4 **Submitted to the California State Board of Forestry and Fire Protection**  
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6 **Revision: November 06, 2018**  
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8

9  
10 **Susan Husari, Co-Chair**  
11 **Member, California State Board of Forestry and Fire Protection**  
12

13 **Russ Henly, Ph.D., Co-Chair**  
14 **California Natural Resources Agency**

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15 Cover photos (clockwise from the top left): Class II-Large water temperature study site on  
16 LaTour Demonstration State Forest; Montana weir at a gaging station in the South Fork of  
17 Caspar Creek watershed, Jackson Demonstration State Forest; Automated bird recorder  
18 installed on Boggs Mountain Demonstration State Forest (BMDSF); and plot-scale sediment  
19 fence installed as part of the BMDSF post-fire runoff and erosion study.  
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22

## 23 EXECUTIVE SUMMARY

24

25 The California State Board of Forestry and Fire Protection (Board) formed the Effectiveness Monitoring  
26 Committee (EMC) in 2014 to develop and implement a monitoring program to address both watershed  
27 and wildlife concerns and to provide a better active feedback loop to policymakers, managers, agencies,  
28 and the public. Effectiveness monitoring is necessary to assess whether management practices are  
29 achieving the various resource goals and objectives set forth in the California Forest Practice Rules  
30 (FPRs), and other natural resource protection statutes and laws, codes and regulations, (EMC 2013,  
31 MacDonald et al. 1991) and is a key component of adaptive management. Effectiveness monitoring is  
32 also a crucial component for complying with the “ecological performance” reporting requirements  
33 outlined in Assembly Bill 1492 (Committee on Budget, Chapter 289, Statutes of 2012).

34

35 Through the Strategic Plan process, the EMC and the Board developed a suite of critical monitoring  
36 questions based on input from a variety of stakeholders and organized them into groups of 11 individual  
37 themes. The EMC uses these themes and critical questions as guidance to solicit and evaluate specific  
38 monitoring projects. The goal is to develop a process-based understanding of the effectiveness of FPRs  
39 and associated regulations in maintaining and enhancing water quality, and aquatic and wildlife  
40 habitats.

41

42 In addition to laying out the critical monitoring questions, the Strategic Plan documents EMC ground  
43 rules, staffing and funding, connections to the AB 1492 Timber Regulation and Forest Restoration  
44 Program, an adaptive management framework, and processes for monitoring project solicitation and  
45 evaluation. The EMC will review and update the Strategic Plan every three years and present it to the  
46 Board for approval.

47

48 Serving as a companion to the Strategic Plan, the EMC Annual Report and Work Plan documents yearly  
49 accomplishments by the Committee, tracks changes in the Committee membership, documents the  
50 project selection process for the year, and provides updates on the status of previously funded  
51 monitoring projects. The work products and processes of the EMC include the following:

52

- 53 • Periodically update EMC Strategic Plan for Board consideration (approximately every three  
54 years).
- 55 • Prepare an Annual Report and Workplan for Board consideration.
- 56 • Regularly meet in open, webcast public meetings to conduct its work.
- 57 • Annual distribution of a Request for Proposal (RFP) soliciting monitoring project proposals. This  
58 distribution includes posting to the EMC website.
- 59 • Review and rank project proposals, and ultimately recommend certain projects for funding by  
60 February of each year. Funding of projects occurs from an annual allocation of \$425,000 each  
61 fiscal year from the Timber Regulation and Forest Restoration Fund (TRFRF).
- 62 • Review Committee membership. A Call for Membership, if necessary, is widely distributed to  
63 encourage a broad spectrum of applicants that meet membership qualifications.

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## LIST OF ABBREVIATIONS

119		
120		
121	ASP	Anadromous Salmonid Protection
122	BMPs	Best Management Practices
123	Board	California State Board of Forestry and Fire Protection
124	CAL FIRE	California Department of Forestry and Fire Protection
125	CCR	California Code of Regulations
126	CDFW	California Department of Fish and Wildlife
127	CEQA	California Environmental Quality Act
128	CGS	California Geological Survey
129	CNRA	California Natural Resources Agency
130	DSF	Demonstration State Forest
131	EMC	Effectiveness Monitoring Committee
132	ESA	Endangered Species Act
133	EX-EM	Exemption and Emergency Notices
134	FGC	Fish and Game Code
135	FGCom	Fish and Game Commission
136	FORPRIEM	FPRs Implementation and Effectiveness Monitoring Program
137	FPA	Forest Practice Act
138	FPC	Board Forest Practice Committee
139	FPRs	California Forest Practice Rules
140	MC	Board Management Committee
141	NMFS	National Marine Fisheries Service
142	NOAA	National Oceanic and Atmospheric Administration
143	Plans	Timber Harvesting Plans and all other harvest documents as defined
144		under 14 CCR § 895.1
145	RPF	Registered Professional Forester
146	THP	Timber Harvesting Plan
147	TMDL	Total Maximum Daily Load
148	TRFR	Timber Regulation and Forest Restoration Program
149	USFS	U.S. Department of Agriculture, Forest Service
150	Water Boards	State and Regional Water Quality Control Boards
151	WLPZ	Watercourse and Lake Protection Zone
152	Working Groups	AB 1492 program Working Groups: Ecological Performance Measures,
153		Data and Monitoring, Administrative Performance Measures, and
154		Interagency Information Systems.
155	WQCP	Water Quality Control Plan, which is commonly referred to as Basin Plan.

## 156 **1.0 INTRODUCTION**

157

158 The EMC was formed in 2014 to develop and implement a monitoring program to address both  
159 watershed and wildlife concerns and to provide a better active feedback loop to policymakers,  
160 managers, agencies, and the public. Effectiveness monitoring is necessary for assessing whether  
161 management practices are achieving the various resource goals and objectives set forth in the California  
162 Forest Practice Act (FPA) and Rules and other natural resource protection statutes and laws, codes and  
163 regulations (EMC 2013, MacDonald et al. 1991). The approach laid out here is a key component of  
164 adaptive management. Effectiveness monitoring is also a crucial component for complying with the  
165 “ecological performance” reporting requirements outlined in AB 1492. The types of monitoring  
166 potentially utilized by the EMC are briefly explained in Figure 1.

167

168 This Strategic Plan communicates the EMC’s goals, actions necessary to achieve the goals, and critical  
169 components of the planning process. The EMC Strategic Plan will be updated approximately every three  
170 years. Section 1.0 of the document provides a brief background on forest practice-related monitoring in  
171 California, describes the membership of the EMC, the goals of the Committee, and ground rules for  
172 interaction among Committee members. Section 2.0 describes the overall strategic plan “road map,”  
173 including the development of critical questions, identification of cumulative effects as an important  
174 issue, and consideration of ecological performance measures. Since monitoring is a key component for  
175 adaptive management, Section 3.0 describes the EMC and Board’s role in an adaptive management  
176 framework. Section 4.0 describes important elements of the planning process, such as scale  
177 considerations for monitoring study design. Section 5.0 describes the process used by the EMC to solicit,  
178 select and fund projects. In addition to the EMC Strategic Plan, the EMC Annual Report and Workplan is  
179 updated annually to track progress on individual projects and document the Committee’s ranking of  
180 proposed monitoring projects.

181

## 182 **1.1 Background**

183

184 Effectiveness monitoring is a key component of adaptive management. The EMC’s work builds upon and  
185 expands previous monitoring work conducted in California. From 1992 through 2014 California’s state  
186 and private forestlands implementation and limited short-term effectiveness monitoring focused  
187 primarily on water quality related issues (Tuttle 1995, Lee 1997, BOF 1999, Cafferata and Munn 2002,  
188 Brandow et al. 2006, Longstreth et al. 2008, BCTF 2011, Brandow and Cafferata 2014). Longer-term  
189 cooperative instream monitoring studies also have studied potential impacts from harvesting practices  
190 on water quality and aquatic habitats. These projects have included the Caspar Creek watershed study  
191 (Rice et al. 1979, Ziemer 1998, Lewis et al. 2001, Cafferata and Reid 2013), the Garcia River Instream  
192 Monitoring Project (Euphrat et al. 1998, Maahs and Barber 2001, Barber and Birkas 2006), the Little  
193 Creek Watershed Study (Skaugset et al. 2012, Loganbill 2013, Dietterick et al. 2015), the Judd Creek  
194 Watershed Study (MacDonald and James 2012), and the South Fork Wages Creek Watershed Study  
195 (RiverMetrics 2011). Existing monitoring approaches have had limited use for adaptive management,  
196 and have only addressed water quality and aquatic habitat concerns. As such, the EMC incorporates  
197 more comprehensive, rigorous and hierarchical forms of monitoring to aid in adaptive management.

198

199 The EMC was formed in 2014 to develop and implement an effectiveness monitoring program to  
 200 address both watershed and wildlife concerns, and to provide a better active feedback loop to  
 201 policymakers, managers, agencies, and the public.

202  
 203 **Figure 1. Monitoring types.**

- |     |   |                |   |
|-----|---|----------------|---|
| 206 | • | Implementation | Assess whether management practices were conducted as designed and planned.   |
| 207 |   |                |   |
| 208 | • | Compliance     | Monitoring used to determine whether specific rule, regulation, code or policy is being met.                                  |
| 209 |   |                |   |
| 210 | • | Effectiveness  | Evaluation of whether a specific management practice had the desired effect.  |
| 211 |   |                |   |
| 212 | • | Project        | Assesses the impact of a specific management activity or project; can be a subset of Effectiveness monitoring.                |
| 213 |   |                |   |
| 214 | • | Validation     | Evaluation of existing data sets or both numerical and conceptual models including management models.                         |
| 215 |   |                |   |
| 216 | • | Baseline       | To identify temporal variability for planning and future comparison.  |
| 217 |   |                |   |
| 218 | • | Trend          | Conducted at regular, well-spaced intervals to determine long-term trend to evaluate management practices or evaluate models. |
| 219 |   |                |   |
| 220 |   |                |   |
| 221 |   |                |   |
| 222 |   |                |   |
| 223 |   |                |   |

224 *(Adapted from MacDonald et al. 1991)*

## 228 1.2 EMC Charter

229  
 230 The Board-approved charter directs the EMC to be a collaborative, transparent, and science-based  
 231 monitoring effort. A goal of the EMC is to develop a process-based understanding of the effectiveness  
 232 of the FPRs and other natural resource protection statutes and laws, codes and regulations, including  
 233 the California Endangered Species Act (ESA), federal ESA, Porter-Cologne Water Quality Act, federal  
 234 Clean Water Act, and Fish and Game Code (FGC) (Figure 2). We refer to these collectively as the FPRs  
 235 and associated regulations in maintaining or enhancing water quality, aquatic habitat, and wildlife  
 236 habitats. The EMC will emphasize addressing specific effectiveness monitoring requirements that are  
 237 contained in the California Forest Practice Rules (FPRs) and statutes.



242 **Figure 2. EMC charter goals.**

243

244 (a) Provide a framework and support to comply with the reporting requirements of AB 1492 (Appendix A).

245 (b) Support an adaptive management process by providing feedback to the Board regarding effectiveness  
of the FPRs and associated regulations.

246 (c) Facilitate and recommend monitoring practices to evaluate how well current practices restore and  
247 maintain riparian, aquatic, and terrestrial habitat on private and state forestlands for state and federally  
listed species and priority species of concern (aquatic and terrestrial).

248 (d) Ensure that the process is consistent with the goals of the Clean Water Act for water quality on private  
and state forestlands.

249 (e) Ensure that the process is consistent with the goals of the Federal and State ESAs on private and state  
250 forestlands.

251 (f) Ensure that appropriate scientific methods and statistical evaluation, when necessary, are used to  
evaluate effectiveness of FPRs and associated regulations.

252 (g) Encourage dissemination of information through general public and scientific outlets.

253 (h) Promote use of State Demonstration Forests for effectiveness monitoring of FPRs, Water Quality laws  
and FGC, and other forestry-related laws and regulations.

254

255

256 **1.2.1 EMC Membership**

257

258 In 2014, the Board appointed two Co-Chairs, 14 Committee members and identified five support staff.  
259 EMC members represent a wide range of natural resource expertise from academia, state and federal  
260 agencies, private and state forestland owners, and the public. Their expertise includes forest  
261 management, forest ecology, hydrology, geology, aquatic ecology, fisheries, wildlife management, and  
262 resource monitoring and sampling. Co-chairs facilitate meetings to ensure all actions and  
263 recommendations are made by consensus whenever possible. If failure to reach consensus occurs, the  
264 record (i.e., meeting notes) shall specify the key differences and the reasons consensus could not be  
265 reached. The Co-Chairs and Executive Officer of the Board establish each Committee member's  
266 respective term duration. Current membership is updated in the EMC Annual Report and Workplan.

267

268

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## 272 **1.2.2 EMC Ground Rules**

273

274 As described in the EMC Charter, EMC meetings shall be publicly noticed and will be open to all  
275 interested parties, following the Bagley-Keene Open Meeting Act requirements. Meeting are webcast to  
276 the extent that technical resources allow. Board-appointed EMC members are encouraged to follow  
277 meeting “ground rules” to foster a collaborative scientific-based approach to achieving the stated goals  
278 and objectives of the EMC (adapted from WFPB 1987).

279 These ground rules include a commitment to:

280

281 ( 1 ) Attempt to reach consensus.

282 ( 2 ) Attend all scheduled meetings.

283 ( 3 ) Listen carefully and ask questions to better understand unclear issues.

284 ( 4 ) Have the EMC receive priority attention, staffing, and time.

285 ( 5 ) Have all EMC members clearly define the purposes and goals of their organizations.

286 ( 6 ) Have all EMC members recognize the legitimacy of the goals and differing  
287 perspectives of other EMC member organizations.

288

289

## 290 **1.3 EMC Reporting**

291

292 The EMC formally reports its activities in three ways. First, the EMC Co-Chair or Board staff give verbal  
293 updates at Board meetings. Second, the EMC updates its Annual Report and Workplan annually. The  
294 EMC Annual Report and Workplan update is approved and finalized by the Board. Third and last, the  
295 EMC is included in the Board’s annual report to the Legislature. The EMC’s portion of this report will be  
296 extracted from the EMC Annual Report and Workplan.

297

## 298 **1.4 EMC Personnel and Funding**

299 Dedicated staff and funding are necessary to achieve EMC goals and objectives, and support projects  
300 reviewed and recommended by the EMC. Public agencies and departments including CAL FIRE,  
301 California Department of Fish and Wildlife (CDFW), State and Regional Water Quality Control Boards  
302 (Water Boards), California Geological Survey (CGS), United States Forest Service (USFS), National Marine  
303 Fisheries Service (NMFS), and the California Natural Resources Agency (CNRA) have committed  
304 personnel to participate in the EMC discussions and meetings. Private landowners, conservation groups,  
305 and universities have also committed personnel. CAL FIRE provides specific personnel to provide  
306 technical support to the EMC. In fiscal year 2015/2016, the Board received the addition of one staff  
307 person funded by the Timber Regulation and Forest Restoration Fund to specifically support EMC  
308 efforts.

309

310 During development of the EMC Strategic Plan several critical needs for future personnel and funding  
311 were identified. These include

312

313 ● Literature review by technical expert(s).

314 ● Study design or statistical review.

315 ● Specialized statistical analysis or modeling.

---

11/6/18

- 316 ● Sponsorship of graduate students or contribution to an existing university study(s).
- 317 ● Ability to respond to and monitor rare and large events (see Section 4.3.1).
- 318 ● EMC supported projects that require additional support for participation of university(s),
- 319 specialized consulting or non-government organizations.
- 320 ● Support for projects consistent with AB 1492 Working Groups. Also see Section 2.3 for more
- 321 information related to the Timber Regulation Forest Restoration (TRFR) program.
- 322 ● Funding to reimburse EMC members travel costs for meetings.
- 323 ● Organizing and holding public outreach meetings to share EMC project information.
- 324 ● Obtaining other sources of data or information for EMC sponsored projects
- 325 (e.g., LiDAR, aerial photos).

326

327 Projects are funded from the TRFR fund. The allocation of funding is detailed in the EMC Annual Report  
 328 and Workplan.

329

## 330 **2.0 EMC STRATEGIC PLAN ROAD MAP**

331 The EMC Strategic Plan road map guides how the Committee intends to achieve the EMC goals and  
 332 objectives. The EMC Strategic Plan is a guidance document. The EMC Annual Report and Workplan is a  
 333 living document that is updated annually to document the project selection process and the progress on  
 334 selected projects. The EMC Strategic Plan is guided by seven primary objectives described in the EMC  
 335 Charter which, for the purposes of developing critical monitoring questions, has been edited and  
 336 summarized in Figure 3.

337

### 338 **Figure 3. Primary objectives in developing critical monitoring questions.**

- Seek, accept, and consider questions from stakeholders and the interested public.
- EMC members, in conjunction with the Board, should identify critical monitoring questions that address various EMC goals and objectives.
- Develop guidance for appropriate scientific methods and statistical evaluation used to evaluate effectiveness of FPRs and associated regulations.
- Increase understanding of the linkage between forest practices and the resource(s) of concern.
- Provide guidance for the acceptable level of scientific uncertainty across the broad spectrum of monitoring efforts from small-scale short-term monitoring to long-term replicated studies.
- Collaboratively develop methods to prioritize monitoring questions, and based on these methods, help select the highest priority projects to monitor.
- Promote collaborative fact-finding and understanding of scientific results at local, regional, and state levels.

339

340

## 341 2.1 Development of Critical Monitoring Questions

342  
343 As the first step in developing critical monitoring questions, the EMC sought and accepted priorities and  
344 monitoring questions from a wide variety of stakeholders including agency(s), department(s), board(s),  
345 and EMC members, and identified key areas of concern from the interested public. Development of  
346 critical monitoring questions is an open and transparent public process where inclusion of priorities and  
347 public comments can be followed on the [EMC webpage](http://bofdata.fire.ca.gov/board_committees/effectiveness_monitoring_committee/)  
348 ([http://bofdata.fire.ca.gov/board\\_committees/effectiveness\\_monitoring\\_committee/](http://bofdata.fire.ca.gov/board_committees/effectiveness_monitoring_committee/)) and in Appendix  
349 C. The EMC reviewed the various proposed priorities and monitoring questions and developed critical  
350 monitoring questions to better understand whether management practices are achieving the various  
351 resource goals and objectives set forth in the FPRs and associated regulations.

352  
353 The second step was to submit to the Board for review a final list of critical monitoring questions along  
354 with a draft Strategic Plan. The Board approved the list of critical monitoring questions with the  
355 Strategic Plan on December 6, 2017. Appendix C summarizes priorities and monitoring questions  
356 received from various stakeholders.

357  
358 The third and final steps are an ongoing process. The third step is to evaluate specific monitoring  
359 projects, described in the EMC Annual Report and Workplan, that aim to address an EMC critical  
360 monitoring question(s). The final step is to initiate EMC sponsored projects.

361

362

## 363 2.2 Cumulative Effects

364

365 The Board identified cumulative effects during committee discussions as a priority in their Annual Report  
366 (Board 2014a). Cumulative impacts in the FPRs are defined as found in the California Environmental  
367 Quality Act (CEQA) guidelines (14 CCR § 15355). Since the EMC recognizes that management practices  
368 may produce either positive or negative cumulative impacts, the EMC will refer to cumulative effects  
369 and cumulative impacts as interchangeable terms. A focus on cumulative effects is consistent with the  
370 goals of the EMC, given that the proper implementation of best management practices (BMPs) is often  
371 cited as an approach for limiting cumulative effects from forest practice activities (Reid 2004). As such,  
372 it is necessary to evaluate the effectiveness of these practices at multiple spatial and temporal scales.

373

374 The EMC recognizes that cumulative effects encompass a broad spectrum of natural processes,  
375 resources of concern, and their linkages over time and space (MacDonald 2000, MacDonald et al. 2004,  
376 Reid 1993). Consequently, EMC projects implement an explicit strategy for monitoring and evaluating  
377 potential cumulative effects. The first element of the strategy is to monitor the causal linkages between  
378 FPRs and associated regulations and the resource(s) of concern at relatively small spatial and temporal  
379 scales, with special emphasis on understanding the management impacts on a particular resource  
380 and/or controlling natural process(es) (MacDonald and Coe 2007). The second element is to use a  
381 nested approach for monitoring to identify linkages at larger spatial and longer temporal scales (see Box  
382 1). This approach would limit problems that have confounded many previous attempts to evaluate  
383 cumulative effects by monitoring discrete causal linkages between FPRs and associated regulations and  
384 resource(s) of concern (MacDonald 2000), and it can apply to cumulative effects in both aquatic and

385 terrestrial systems. Section 4.3 provides more guidance on choosing the appropriate spatial and  
386 temporal scale for monitoring.  
387

### **Box 1: Case Study of Cumulative Watershed Effects: The Caspar Creek Experimental Watershed Study**

Monitoring programs that implement hierarchical and nested sample designs can focus on multiple study objectives in an integrated manner. Cumulative effects are the result of multiple localized impacts that manifest themselves at larger spatial and temporal scales. Nested study designs that characterize processes and linkages across multiple scales are best suited to address the multiscale complexities of cumulative effects (Ralph and Poole, 2001). The Caspar Creek Experimental Watershed Study provides a case study for illustrating these principles.

The Caspar Creek study is a cooperative project between CAL FIRE and the USFS Pacific Southwest Research Station located on Jackson Demonstration State Forest. It is the only research study with long-term records of streamflow and sediment from nested small watersheds in northern California. Caspar Creek has been the subject of three separate watershed studies, with the first experiment conducted in the South Fork starting in 1962. The second experiment began in 1985, with the goal of investigating cumulative watershed effects resulting from clear-cut harvesting primarily using cable yarding in the North Fork. The cumulative effects of logging and road construction on suspended sediment, storm runoff volume, and peak streamflow were documented using the modern FPRs in effect from 1989 to 1992. The extent of clearcutting in individual gaged tributaries ranged from 35% to nearly 100%, using a nested watershed design. The third experiment began in 2011 in the South Fork and is examining the influence of forest stand density reduction (25% to 75%) in gaged tributary watersheds on physical, chemical, and biological watershed processes. Six gaged sub-watersheds with varying levels of stand reduction will be harvested in 2018, with 2 sub-watersheds serving as controls and 3 monitoring stations located on the mainstem of the South Fork. The third experiment is nested from the individual tree all the way to the watershed scale.

Results produced from the first two experiments indicated that suspended sediment loads increased almost 3-fold from selection logging and road construction prior to implementation of the modern FPRs. Smaller, but statistically significant, increases in sediment were associated with clearcutting and road construction conducted under the FPRs in effect during the second experiment. The effects of multiple disturbances on suspended loads were found to be approximately additive, and downstream suspended load increases were no greater than would be expected from the proportion of area harvested. Runoff-induced gully initiation and rejuvenation in low order watercourses was found to be a major sediment source during periods without large landslides. Results to be produced from the third experiment in the South Fork will provide additional information on cumulative watershed effects with its innovative nested design.

## 388 **2.3 Ecological Performance - Timber Regulation and Forest Restoration** 389 **Program**

390

391 The TRFR Program is directed by AB 1492 to develop ecological performance measures for state and  
392 private forestland management. Figure B-2 in Appendix A provides some context for the scale of these  
393 ecological performance measures. The TRFR Program has been making gradual progress in this work,  
394 with initial support from the University of California, Berkeley, to prepare a white paper on science,  
395 concepts, and potential approaches for ecological performance measures. A modified version of that  
396 white paper is currently under development by CNRA staff. The intent is that the white paper will  
397 provide a common basis of terms and concepts that the TRFR Program can use to engage agencies and  
398 the public in discussions toward the development of ecological performance measures for state and  
399 private forestland management. Completion of ecological performance measures is anticipated  
400 sometime in 2019. Ultimately, the ecological performance measures developed through this process  
401 will interconnect with the monitoring questions that the TRFR Program needs to answer.

402

403 Natural variability is an inherent characteristic of healthy ecosystems and plays a beneficial role in  
404 maintaining ecosystem functions and processes (Holling and Meffe 1996). This innate heterogeneity is  
405 an important measure of ecological performance; however, defining quantitative metrics for the natural  
406 range of variability is complex and not currently captured in the FPRs and associated regulations. For  
407 that reason, effectiveness monitoring projects are unlikely to address range of variability. Such concepts  
408 are more likely to fit under the aegis of the Ecological Performance Measures Working Group and will be  
409 discussed more thoroughly in the ecological performance measures white paper.

410

## 411 **2.4 EMC Themes and Critical Monitoring Questions**

412

413 EMC members, in conjunction with the Board, reviewed priorities and monitoring questions provided by  
414 a wide variety of stakeholders and how they may achieve various EMC goals and objectives (see  
415 Appendix C for more detail). The specific FPRs for each priority or monitoring question and associated  
416 regulations or policies are also described in Appendix C. The EMC has transformed the priorities into  
417 critical monitoring questions following a specific structure which is intended to improve understanding  
418 and allow better comparisons between multiple monitoring questions (Figure 4).

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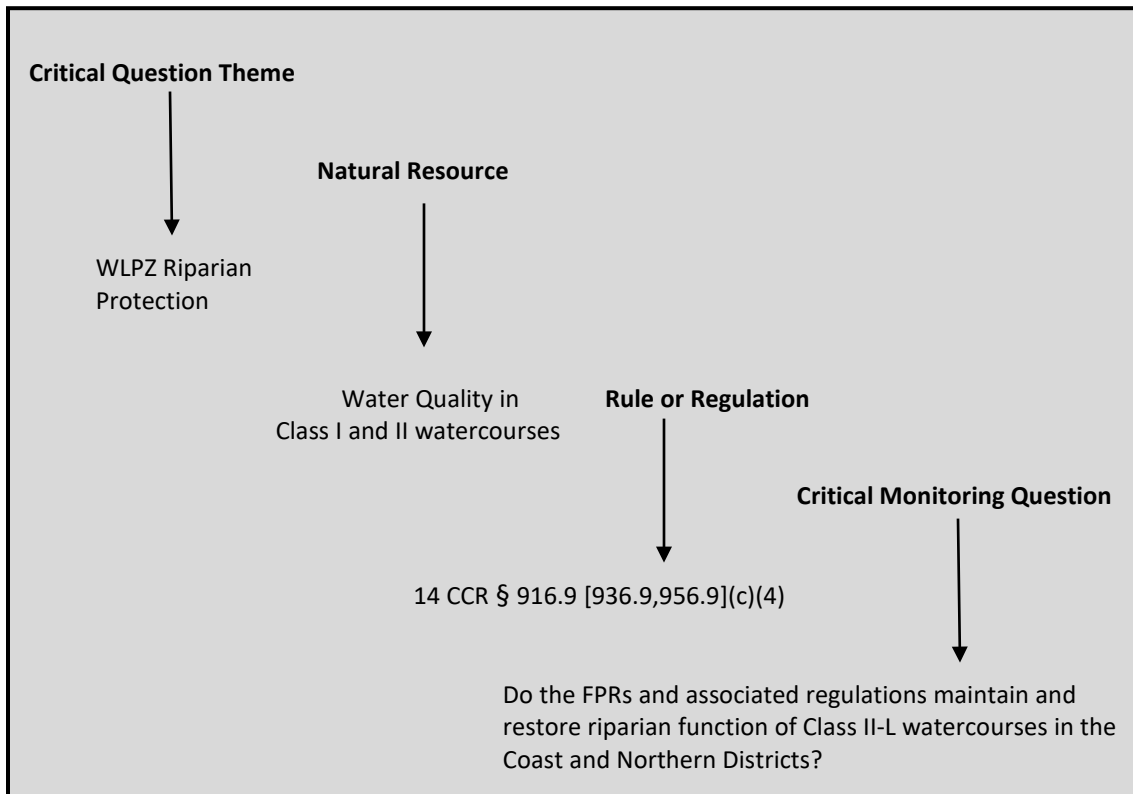
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**Figure 4. Example: EMC critical monitoring question structure.**



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During the development of critical monitoring questions the EMC summarized the questions by critical question themes. The monitoring questions were summarized into a total of eleven individual themes. The themes listed below are in no particular order. In addition to these descriptions, a full table of Priorities received from Boards, Departments, and Agencies including appropriate Forest Practice Rules, Regulations, and Policies is available on the board website under under the EMC section titled “Mission and Goals.” ([http://bof.fire.ca.gov/board\\_committees/effectiveness\\_monitoring\\_committee\\_/](http://bof.fire.ca.gov/board_committees/effectiveness_monitoring_committee_/))

**Theme 1: WLPZ Riparian Function**

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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

453 CCR § 916.9 [936.9, 956.9](v)). Key functions of riparian zones include large wood recruitment,  
 454 watercourse shading, sediment filtration, nutrient input, microclimate control, streambank/hillslope  
 455 stability, and habitat for terrestrial wildlife species. The WLPZ FPRs can contribute toward meeting goals  
 456 of Fish and Game Commission (FGCom) and/or FGCom and Board (Joint) policies, including: Endangered  
 457 and Threatened Species Policy, Salmon Policy, Water Policy, and Joint Pacific Salmon and Anadromous  
 458 Trout Policies. Riparian areas occur dynamically within watersheds adjusting to successional vegetation  
 459 changes and annual hydrologic events and other disturbances (e.g., wildfires, wind, insect, diseases). In  
 460 addition, the WLPZ FPRs may also contribute toward meeting Basin Plan objectives. Accordingly, the  
 461 following critical questions should focus on the natural processes and function of WLPZs and have  
 462 allowances for the dynamic nature of these management areas.

463

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

465

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

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

482

### 483 **Theme 2: Watercourse Channel Sediment**

484

485 Since the implementation of the modern FPRs in 1975, a primary goal of these regulations has been to  
 486 limit the delivery of management-related sediment to watercourse channels in California. The amount  
 487 of hillslope erosion and sediment delivery that occurs following timber operations depends on  
 488 numerous factors, including the site conditions present (e.g., slope, soil type, vegetative cover), soil  
 489 disturbance, level of proper FPR implementation, and intensity and number of large storm events  
 490 following the completion of logging. The FPRs have been upgraded numerous times in the past 40 years  
 491 to reduce management-related sediment delivery. Specifically, current silviculture practice regulations  
 492 (14 CCR § 913 [933, 953]), harvesting practices and erosion control measures (14 CCR § 914 [934, 954]),  
 493 watercourse and lake protection (14 CCR § 916 [936, 956]) and logging roads, landings and logging road  
 494 watercourse crossings rules (14 CCR § 923 [943, 953]) provide measures to ensure timber operations  
 495 meet the goals and intent of the FPRs by limiting sediment delivery to stream channels. These FPRs can  
 496 contribute toward meeting goals of FGCom and/or FGCom and Board (Joint) policies that address  
 497 protection of water quality and fish habitat, including the Endangered and Threatened Species, Salmon,



498 Water, and Joint Pacific Salmon and Anadromous Trout Policies. In addition, these FPRs may also  
 499 contribute toward meeting Basin Plan objectives. The critical questions for Theme 2 address erosion  
 500 and sediment monitoring at both the watershed (or sub-watershed) scale and Plan scale.

501 **Critical Questions:**

502

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

505 (a) at the watershed and sub-watershed level in managed watersheds?

506 (b) for individual Plans at the project level to evaluate channel response to forest  
 507 management prescriptions and additional mitigation measures?

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

509 *(see Section 4.3 for discussion of appropriate scale(s)).*

510

511 **Theme 3: Road and WLPZ Sediment**

512

513 Similar to Theme 2, the Road and WLPZ Sediment theme has been developed to answer critical  
 514 questions regarding management-related hillslope erosion and sediment delivery to watercourse  
 515 channels in forested watersheds. Theme 3 focuses on critical questions related to the effectiveness of  
 516 FPR requirements included in the recently implemented Road Rules 2013 requirements (14 CCR § 923  
 517 [943, 953]). These FPRs also contribute toward meeting goals of FGCom and/or FGCom and Board  
 518 (Joint) policies that address protection of water quality and fish habitat listed above. In addition, these  
 519 FPRs may also contribute toward meeting Basin Plan objectives.

520

521 **Critical Questions:**

522

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

524 (a) reducing or minimizing management-related generation of sediment and delivery  
 525 to watercourse channels?

526 (b) reducing generation and sediment delivery to watercourse channels when timber  
 527 operations implement the Road Rules 2013 measures?

528 (c) reducing the effects of large storms on landslides as related to roads, watercourse  
 529 crossings and landings?

530 (d) maintaining or improving fish passage through watercourse crossing structures?

531 *(see Section 4.3 for discussion of appropriate scale(s))*

532

533 **Theme 4: Mass Wasting Sediment**

534

535 To limit mass wasting sediment from anthropogenic sources, the FPRs require that timber operations be  
 536 planned and conducted to provide mitigation measures to minimize sediment delivery from unstable  
 537 geologic features (14 CCR § 923 [943, 953]). While considerable past monitoring efforts have addressed  
 538 implementation and short-term effectiveness of FPRs designed to limit sediment entry related to  
 539 surface erosion processes, less documentation has occurred on a statewide basis for success of the FPRs  
 540 in preventing accelerated rates of management-related mass wasting features. This is particularly  
 541 important in the California Coast Ranges and Klamath Mountains, where landslide features can be the  
 542 primary sediment delivery mechanism. Achieving this goal is consistent with the goals of FGCom and/or

543 FGCom and Board (Joint) policies, including the Endangered and Threatened Species, Salmon, Water,  
 544 and Joint Pacific Salmon and Anadromous Trout Policies. In addition, these FPRs may also contribute  
 545 toward meeting Basin Plan objectives. The critical questions for this theme address specific mass  
 546 wasting-related topics to determine if the current rules and regulations are effective in avoiding and  
 547 reducing management-induced landsliding.

548 **Critical Questions:**

549  
 550 Are the FPRs and associated regulations effective in minimizing sediment delivery to maintain water  
 551 quality from ...

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

555

556 **Theme 5: Fish Habitat**

557

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

569 **Critical Questions:**

570

571 Are FPRs and associated regulations effective in ...

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

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

577

578 **Theme 6: Wildfire Hazard**

579

580 A goal of the FPRs is the production and maintenance of forests which are healthy and naturally diverse  
 581 (14 CCR § 897). Numerous studies have shown that creating these types of forests reduces the risk of  
 582 high severity wildfire (Safford et al. 2012, North et al. 2009, Omi and Martinson 2004, Martinson and  
 583 Omi 2003). Several FPR sections address this wildfire hazard reduction theme, including minimum  
 584 stocking standards (14 CCR § 912.7 [932.7, 952.7]), special silvicultural methods and stocking  
 585 requirements (14 CCR § 961), silvicultural objectives and regeneration methods (14 CCR § 913 [933,

586 953]), logging slash and hazard reduction (14 CCR § 917 [937, 957]), exemptions which facilitate removal  
 587 of dead, dying or diseased trees (14 CCR § 1038), emergency notices which also facilitate removal of  
 588 burned, dead, dying or diseased trees (14 CCR § 1052) and fuel hazard reduction (14 CCR § 1051). All of  
 589 these rule sections provide measures to ensure timber operations meet the goals and intent of the FPRs.  
 590 These FPRs appear to contribute toward meeting the goals of FGCom or Joint FGCom and Board policies,  
 591 including: Endangered and Threatened Species Policy, Salmon Policy, Water Policy, Joint Pacific Salmon  
 592 and Anadromous Trout Policy, and Interim Joint Policy on Pre, During and Post Fire Activities and  
 593 Wildlife Habitat. In addition, these FPRs may also contribute toward meeting water quality standards.  
 594 To date, little effectiveness monitoring related to this theme has occurred on a statewide basis. The  
 595 following critical questions address specific topics related to wildfire hazard reduction. This theme has  
 596 been further bolstered and brought to the forefront of immediate concerns, due to widespread and  
 597 increasingly destructive nature of wildland fires within the state. Governor Brown Jr. had  
 598 decreed via executive order, for the formation of the California Forest Management Task Force<sup>1</sup>  
 599 (formerly: Tree Mortality Task Force) whose foundation is built on guiding land management into  
 600 creating healthier and more fire-resilient landscapes.

601

602 **Critical Questions:**

603

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

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

610

611 **Theme 7: Wildlife Habitat: Species and Nest Sites**

612

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

622 **Critical Questions:**

623

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

- 625 (a) following general protection measures in 14 CCR § 919.2 [939.2, 959.2](b)?

---

<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>.

626 (b) following species specific habitat and disturbance measures in 14 CCR § 919.3 [939.3,  
627 959.3]?

628

629

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

631 (a) ensuring take avoidance following 14 CCR § 919.9 [939.9] and 14 CCR § 919.10  
632 [939.10]?

633 (b) ensuring take avoidance following 14 CCR § 919.9 [939.9](g)?

634 (c) maintaining adequate amounts of suitable habitat to protect and conserve owls?

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

636

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

638

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

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

653

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

655 (a) retaining and recruiting late and diverse seral stage habitat components in WLPZs  
656 for wildlife?

657 (b) maintaining or increasing the amount and distribution of late succession forest stands  
658 for wildlife?

659 (c) maintaining or recruiting adequate amounts of early- and mid-seral habitats?

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

661

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

663

664 Theme 9 has been included to specifically address cumulative impacts and wildlife habitat. The FPRs  
665 require that timber operations shall be planned and conducted to maintain suitable habitat for wildlife  
666 species (14 CCR § 919 [939, 959]). Also, the FPRs require a Cumulative Impacts Assessment (14 CCR §  
667 898) to be completed that includes, but is not limited to, the overall biological habitat condition within  
668 both the plan and planning area. Technical Rule Addendum No. 2 provides specific guidance that the  
669 assessment of biological habitat conditions should consider: snags and den trees, down, large woody

670 debris, multistory canopy, road density, hardwood cover, late seral forest characteristics and late seral  
 671 habitat continuity (14 CCR § 912.9 [932.9, 952.9]). With respect to terrestrial species and their habitats,  
 672 these FPRs appear to contribute toward reaching the goals of FGCom policies, including: Endangered  
 673 and Threatened Species Policy and Raptor Policy. The critical questions that follow address cumulative  
 674 biological resources-related questions.

675 **Critical Questions:**

676

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

678 (a) characterizing and describing terrestrial wildlife habitat and ecological processes?

679 (b) avoiding significant adverse impacts to terrestrial wildlife species?

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

681

682 **Theme 10: Wildlife Habitat: Structures**

683

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

693 **Critical Questions:**

694

695 Is Variable Retention silviculture effective in meeting ...

696 (a) ecological objectives including co-benefits?

697 (b) social objectives?

698 (c) geomorphic objectives?

699

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

701 (a) a mix of stages of snag development that maintain properly functioning levels  
 702 of wildlife habitat?

703 (b) native oaks where required to maintain wildlife habitat (14 CCR § 959.15)?

704

705 **Theme 11: Hardwood Values**

706

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

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

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

725

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

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

733

734

## 735 **2.5 Exemption and Emergency Notice Monitoring**

736

737 While not a funded EMC project, Exemption and Emergency (EX-EM) Notice monitoring became an  
 738 important task for the Review Team agencies beginning in 2016 with new statutory direction from the  
 739 Legislature. EX-EM Notices are documents containing strict operational prohibitions and requirements  
 740 for use in exchange for ministerial review and rapid approval. Notices of Exemption are presumed to be  
 741 compliant with the California Environmental Quality Act (CEQA) and not subject to discretionary review  
 742 by the Review Team agencies. Notices of Exemption are only exempt from the requirement for a Timber  
 743 Harvesting Plan (THP). Emergency Notices are intended to give a landowner a head start on timber  
 744 salvage operations following tree mortality events related to fire, insect, or disease outbreaks while a  
 745 THP is in development. However, timber operations conducted under either Notice type must still  
 746 adhere to the operational provisions of the FPRs and be compliant with all other relevant laws and  
 747 regulations for protection of natural resources.

748

749 Though considerable information has been collected on THP FPRs compliance and effectiveness,  
 750 virtually no effectiveness monitoring data have been collected on EX-EM Notices prior to 2018. With  
 751 expanded use of EX-EM Notices due to the massive bark beetle tree mortality event in the interior part  
 752 of California from 2012 to 2016 and numerous catastrophic timber fires in the last six years, concern by  
 753 the Legislature and the public has risen regarding the level of EX-EM Notice compliance with the FPRs  
 754 and their effectiveness in protection of resource values. Prompted in 2016 by Assembly Bills 1958  
 755 (Wood) and 2029 (Dahle), with additional direction from Senate Bill 92 in 2017, CAL FIRE and the Board  
 756 initiated a long-term monitoring program for EX-EM Notices.

757

758 Initial testing of a pilot monitoring protocol took place on Boggs Mountain Demonstration State Forest  
759 in the spring of 2018. Representatives from the California Department of Fish and Wildlife (CDFW),  
760 California Geological Survey (CGS), and both the Central Valley and North Coast Regional Water Quality  
761 Control Boards participated with CAL FIRE staff to complete pilot project monitoring during the summer  
762 of 2018. Small interagency teams evaluated 50 randomly selected EX-EM Notices that had experienced  
763 at least one winter period (six Notices were not harvested). Three types of EX-EM Notices were  
764 monitored in the field: Exemption Notices 1038(k)—drought mortality, 1038(j)—forest fire prevention  
765 pilot, and Emergency Notice 1052.1b—fire damage. Field data protocols focused on measuring residual  
766 stand structure, relative intensity of harvesting, fuel characteristics, wildlife habitat elements, road  
767 drainage and associated erosion features, watercourse crossing impacts, and watercourse protection.  
768

769 An EX-EM Notice pilot project report will be written before the end of 2018 pursuant to deadlines  
770 initially imposed by AB 1958 and 2029, and later extended by SB 92. Senate Bill 901 from the 2018  
771 Legislative Session further modified the reporting requirement to make it an annual undertaking of the  
772 Department and Board beginning December 31, 2019. SB 901 also directs the Department and Board to  
773 report on linear distance of road construction or reconstruction, Forest Practice Rule violations and  
774 enforcement actions, and the number of post-treatment site inspections completed by the respective  
775 Review Team agencies.  
776

777 EX-EM Notice monitoring results are directly applicable to the goals and objectives of the EMC. EX-EM  
778 Notice monitoring supports adaptive management, providing a feedback loop to the public trust  
779 agencies, the public, and the Legislature regarding Forest Practice Rule compliance and effectiveness.  
780

781

## 782 **2.6 EMC Supported Monitoring Projects**

783

784 Details on EMC supported projects are available online at:

785 [http://bofdata.fire.ca.gov/board\\_committees/effectiveness\\_monitoring\\_committee/](http://bofdata.fire.ca.gov/board_committees/effectiveness_monitoring_committee/)

786 and in the EMC Annual Report and Workplan.  
787

## 788 **3.0 ADAPTIVE MANAGEMENT FRAMEWORK**

789

790 The Board has previously discussed the benefits of implementing an Adaptive Management Framework  
791 (Board 2014b, EMC 2013). The Adaptive Management Framework is an overall strategy designed to  
792 consider scientific information provided by the EMC to better inform Board policy (Figure 5).

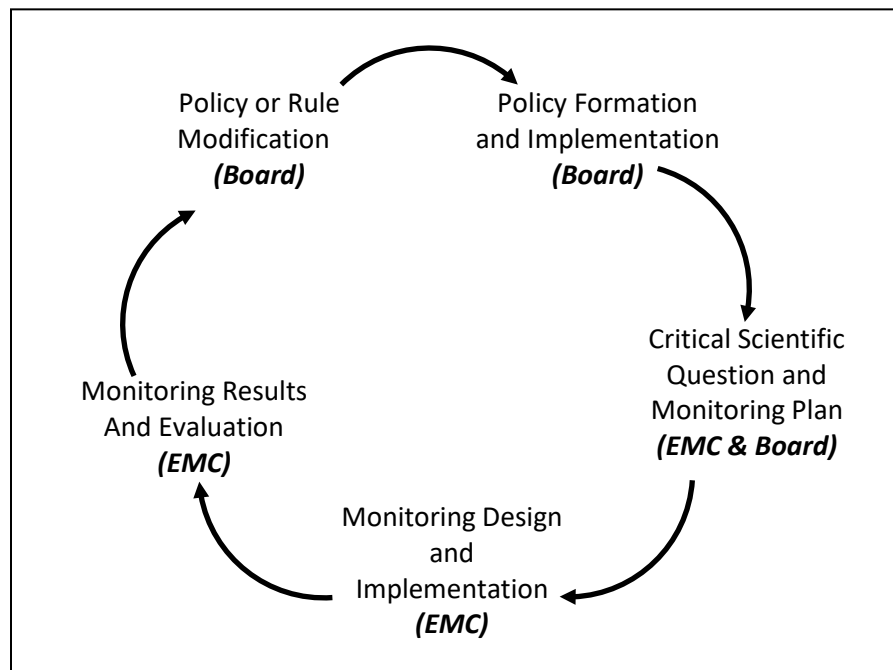
793 Specifically, the Board will review results of EMC sponsored scientific studies to determine how effective  
794 the FPRs and associated regulations are in meeting their goals. In addition to results of scientific studies,  
795 the Board may consider the following four goals as part of the Adaptive Management Framework:  
796

797 ( 1 ) To provide compliance with the state and federal ESAs for species found on state and private  
798 forestlands.  
799

800 ( 2 ) To maintain and restore forest-dependent species on state and private forestlands.  
801

- 802 ( 3 ) To meet the requirements of the federal Clean Water Act and Porter-Cologne Water Quality
- 803 Control Act on state and private forestlands.
- 804
- 805 ( 4 ) To keep private forestlands economically viable in the State of CaliforniaAttempting to impart
- 806 regulatory streamlining, while still enhancing California’s timberland habitat, is a continuing goal
- 807 and priority of the EMC.
- 808
- 809

810 **Figure 5. The Adaptive Management Framework using EMC sponsored monitoring to**  
 811 **better inform Board policy and regulations.**



832 When the Board reviews scientific information from EMC sponsored studies it is important for Board  
 833 members to understand the overall context and implications of the research. To achieve this objective  
 834 the Board shall review information provided in the scientific report and additional information provided  
 835 by the EMC that describe:

- 837 ( 1 ) The scientific or policy relevance of the study.
- 838
- 839 ( 2 ) The overall quality of the study design and results.
- 840
- 841 ( 3 ) Confidence in results explaining the effectiveness of the FPRs, Water Quality Objectives, FGC, or
- 842 other regulations.
- 843

844 In addition, the Board has discussed the respective responsibilities of the EMC and the Board with  
 845 regard to the scientific report. Appendix B contains a detailed list of these responsibilities. One portion



846 of the list refers to scientific questions appropriate for the EMC, while the Board portion of the list refers  
847 to more policy-based questions.

848

849

## 850 **4.0 SCIENTIFIC METHODS**

851

### 852 **4.1 Resource Benefit**

853

854 To allow Board members to better evaluate cost of implementing the existing FPRs and associated  
855 regulations, the Board has requested the EMC to evaluate the resource benefit of EMC-sponsored  
856 projects. As an example, the Board has requested that the FPRs Road Rules 2013 be evaluated for  
857 effectiveness in providing resource benefit and an economic cost of rule implementation. The EMC  
858 reviewed this request by the Board and determined that, if appropriate, relevant, and feasible, EMC  
859 sponsored projects should include an evaluation.

860

861 For each individual EMC sponsored project an evaluation may be completed of the resource benefit and  
862 economic cost of implementing the specific existing FPRs and associated regulation. This evaluation  
863 may be completed by the principal investigator or the EMC. The evaluation can be completed using the  
864 following guidance:

865

866 ( 1 ) The amount of detail should be tailored to the overall potential economic cost to landowners  
867 (e.g., higher potential economic cost requires more detail).

868 ( 2 ) If relevant, the evaluation should attempt to distinguish between land owner types; state vs.  
869 private and large vs. small landowners.

870 ( 3 ) If relevant, the evaluation should attempt to distinguish among Plan types: THP, Modified THP,  
871 Nonindustrial Timber Management Plan, Working Forest Management Plan; or Emergency or  
872 Exemption Notices.

873 ( 4 ) The evaluation should describe geographically by Region or County, if appropriate, where  
874 resource benefits and economic cost of the existing FPRs and associated regulations may be  
875 different.

876

877 In summary, the purpose of evaluating economic costs is to enable analysis of resource benefits within  
878 the context of resulting landowner economic burdens.

879

### 880 **4.2 Study Design within an Adaptive Management Framework**

881

882 The goal of any effectiveness monitoring study design is to determine if the FPRs and associated  
883 regulations related to natural resources management are maintaining and/or restoring desired  
884 ecological conditions. Monitoring studies in California will need to be able to detect changes in the  
885 environment from both individual and cumulative activities that are both spatially and temporally  
886 distributed on the landscape. Results will be used in an adaptive management framework to determine  
887 if existing policies and practices are working and confirm policies and practices are appropriate, or to

888 craft new management practices, policies or regulations when the current ones are not achieving their  
889 desired result.

890

891

892 Because of the complexity and uncertainty surrounding natural resource management, study protocols  
893 will be embedded within an adaptive resource management model, summarized as:

894

- 895 ( 1 ) Defining the objectives and scope of management
- 896 ( 2 ) Developing operational plans to meet the objectives
- 897 ( 3 ) Implementing plans
- 898 ( 4 ) Collecting information about the impacts of the plans
- 899 ( 5 ) Evaluating the collected information in light of stated objectives
- 900 ( 6 ) Adjusting plans in light of new information

901

902 Adaptive management “provides a framework for making good decisions in the face of critical  
903 uncertainties, and a formal process for reducing uncertainties so that management performance can be  
904 improved over time.” (Williams et al. 2009). Each of the steps of the adaptive management cycle, and its  
905 relevance for the EMC, is elaborated below.

906

907 **Defining the objectives and scope of management** – Studies considered by the EMC need to be  
908 designed to address: (1) existing or proposed forest management practices and; (2) objectives as  
909 defined through legislation (e.g., ESA, FPA), FPRs and associated regulations, and/or by stakeholders.  
910 Studies should state the management objectives that they are addressing, and include relevant  
911 answerable research questions. These research questions can include ecological, economic, and social  
912 considerations, as appropriate.

913

914 **Developing operational plans to meet the objectives and implementing plans** – The EMC will evaluate  
915 impacts from forest management activities planned and implemented by landowners, managers, and  
916 researchers. Research designs may be observational (testing existing management or conditions or  
917 analyzing existing datasets) or based on experimental designs. In either case, the anticipated outcomes  
918 of forest management and contribution toward achieving defined objectives will be stated upfront,  
919 based on a thorough literature review outlining existing knowledge and research gaps.

920

921 Monitoring studies must have valid designs, allowing for proper inferences about the phenomenon of  
922 interest. There are several broad potential approaches to designing effectiveness monitoring studies.  
923 One involves sampling populations, typically by comparing response variables from one set of  
924 treatments with another set of treatments (e.g., control-treatment). A second approach is through the  
925 use of experiments where treatments are deliberately prescribed and randomly assigned to  
926 experimental units. The advantage of the experimental approach is that the treatments may be of  
927 greater forest management intensity than the current FPRs allow and the results of an experiment can  
928 provide information that would not be available from a sample.

929

930 Studies will base their sampling design using previous literature or pilot tests to determine population  
931 variability, and to perform statistical power analysis for determining adequate sample sizes. The high  
932 natural variability commonly found in natural systems can make finding appropriate comparative groups

933 (e.g., control and treatment) difficult, as the goal is to have these groups as similar to each other as  
934 possible to allow for the detection of differences.

935

936 **Collecting information about the impacts of the plans** – The EMC will rely on information collected  
937 through monitoring, which can take multiple forms, including baseline monitoring (measuring current  
938 conditions); trend monitoring (measuring attributes over time); effectiveness monitoring (measuring  
939 whether objectives of a project have been met); and validation monitoring (testing whether models are  
940 accurate).

941

942 **Evaluating the collected information in light of stated objectives** – The EMC will evaluate data for  
943 evidence of consistency with identified objectives. Evaluation will frequently take the form of statistical  
944 testing, using either frequentist or Bayesian statistical methods. However, data may take multiple forms  
945 and they will be analyzed according to the research questions posed. At times, analysis may need to rely  
946 on expert opinion especially when statistical analysis is inconclusive.

947

948 **Adjusting plans in light of new information** – Findings of the EMC should have means for integration  
949 into future forest management plans, through changed policy, landowner outreach, or other means. In  
950 addition, findings of the EMC should supplement existing and ongoing research conducted by other  
951 researchers.

952

953 Because of the multiple, competing objectives for forest lands in the state of California, the EMC will not  
954 be able to objectively state the “best” course of action for policy makers or managers. Rather, the EMC  
955 will collect as much information as possible to evaluate the impacts of forest policies and management  
956 decisions in light of identified management objectives. The adaptive management process facilitates  
957 learning “not by trial and error, but by a structured process,” resulting in reduced uncertainty (Allen and  
958 Gunderson 2011).

959

### 960 **4.3 Appropriate Temporal and Geographic Scale**

961

962 This section provides guidance for selecting appropriate spatial and temporal scales when designing a  
963 monitoring study. Spatial scale defines the geographic area of a study such as a road segment, hillslope,  
964 or watershed. Temporal scale defines the time period of interest. In forest practice, this may be as short  
965 as one storm event or span several decades. Most FPR effectiveness monitoring studies conducted to  
966 date have focused on the site scale (e.g., road segment, harvest unit, stream reach) and are directed at  
967 prescription effectiveness over one- to four-year periods (e.g., Brandow and Cafferata 2014).

968

969 The selection of appropriate spatial and temporal scales for a monitoring study requires a review of  
970 current knowledge, understanding of the issue, and professional judgment. Scale selection must  
971 correspond to the specific study objectives, which should define the resource of concern (e.g., water  
972 quality), the controlling factors affecting the resource of concern, and the scale of those controlling  
973 processes (e.g., hillslope, reach or watershed scale). For time scales, controlling processes should be  
974 identified as deterministic or stochastic. Deterministic processes are finite and produce the same result  
975 for a given set of input variables whereas stochastic (probabilistic) processes are indeterminate – they  
976 produce a range of possible outcomes defined by a probability distribution. The temporal scale of a

977 study should be at least as long as the duration (including lag times) of controlling processes relevant to  
978 the study objectives. Temporal and spatial scales are not effortlessly separated, and knowledge of  
979 variability over time and space is necessary to effectively allocate monitoring efforts (Bunte and  
980 MacDonald 1999).

981  
982 Typically, monitoring at large spatial or temporal scales increases the number and complexity of  
983 controlling processes, making it difficult to discern specific linkages between a controlling process and  
984 resource of concern. This can add uncertainty to study findings (MacDonald and Coe 2007).  
985 Consequently, monitoring projects should focus on the smallest spatial and temporal scales necessary to  
986 achieve the study objectives. Using an adaptive management framework, experience and refinements  
987 made from initial study phases can be used to adjust temporal and spatial scales so that study objectives  
988 are achieved. To address more complex study objectives, a monitoring plan framework of nested and  
989 cross-referenced monitoring studies at a range of scales can be applied (MacDonald 2000). Such a  
990 monitoring plan framework can be used to identify scale linkages and increase certainty in cause and  
991 effect relationships for complex studies, as well as save on costs and resources over the long-term  
992 (Cafferata and Reid 2013).

993  
994

#### 995 **4.3.1 Rare or Large Event Monitoring**

996

997 Monitoring in most forested areas is typically too short-lived to sample the variability of natural and  
998 disturbed hydrologic systems, and has a low probability of documenting environmentally significant  
999 episodic events such as large floods, landslides and debris flows. Dispersed monitoring seldom captures  
1000 the linkages between large natural disturbance events and the transitory effects of forest practice  
1001 activities (Dunne 2001). A comprehensive monitoring program should have a component that addresses  
1002 the intersection of management and stressing events so that the effectiveness of forest practices can be  
1003 evaluated across the widest range of environmental conditions. These events are not just hydrologic  
1004 events, but can be from a variety of natural phenomena or may be from a combination of natural events  
1005 such as those listed below:

1006

- 1007 ( 1 ) Rain-on-snow events that cause rapid increase in stormwater runoff, which can overwhelm  
1008 drainage systems.
- 1009 ( 2 ) A single storm or sequences of storms that saturate the soils that promotes conditions where  
1010 landslides can deliver a variety of sizes of sediment and woody debris to streams.
- 1011 ( 3 ) Earthquakes that can instantaneously trigger landsliding through ground shaking, or steepen  
1012 slopes and/or weaken hillslope materials to where instability is triggered in subsequent rainfall  
1013 events.
- 1014 ( 4 ) Drought that can cause significant low flow that may compromise passage of aquatic  
1015 organisms through estuaries and drainage structures, or can increase the likelihood of stream  
1016 dewatering during water drafting operations.
- 1017 ( 5 ) Drought that may lead to conditions where dense riparian areas can result in higher burn  
1018 intensities within WLPZs and increased spread within watersheds.
- 1019 ( 6 ) Large wildfires that affect large components of a bioregion or watershed, affecting  
1020 significant numbers of aquatic and terrestrial organisms.

1021 ( 7 ) Episodic forest pest and/or disease-induced tree mortality exacerbated by prolonged periods of  
1022 drought and/or higher than normal temperature regimes.

1023 ( 8 ) Wind storm events causing loss of mature trees to windthrow across very large areas.

1024

1025 An effectiveness monitoring program that relies on annual measurements may not capture the  
1026 information necessary to determine the effectiveness of these practices relative to larger events.  
1027 Kirchner et al. (2001) found that catastrophic erosion events are infrequent and of short duration, but  
1028 can control long-term sediment yield. They also noted that land use activities may alter the probability  
1029 or magnitude of catastrophic events. Since these events are rare they should be proactively targeted for  
1030 effectiveness monitoring.

1031

1032 Therefore, a different approach to standard monitoring is needed that will be able to respond to the  
1033 large or rare events immediately following their occurrence and for some period of time after. This type  
1034 of monitoring will require that a reserve of funds be set aside to respond immediately to the sites  
1035 following the occurrence of a rare or large event to determine the effectiveness of the modern  
1036 practices; an approach referred to as “post-mortem” monitoring (Stewart et al. 2013). Examples of past  
1037 monitoring after large flood events include Furniss et al.’s (1998) evaluation of watercourse crossing  
1038 performance in Washington, Oregon and northern California, and Robison et al.’s (1999) review of  
1039 landslide impacts from large storms in western Oregon. In California, specific research questions can be  
1040 addressed, such as (1) are unstable area prescriptions (e.g., canopy retention, leave areas within  
1041 unstable landforms) effective for mitigating against mass wasting during high magnitude, low frequency  
1042 storm events; or (2) are flows in culverts and their outlets meeting their minimum depth requirement  
1043 for organism passage during low flows or do flows become hyporheic resulting in the culverts and their  
1044 outlets becoming a barrier.

1045

1046 Effectiveness monitoring or research plans should be prepared in advance of these infrequent events. A  
1047 critical component of any monitoring or research design is to identify the rare or large event that  
1048 triggers “post-event” monitoring. Resources must be allocated prior to event occurrence so that  
1049 resources can be deployed when a rare or large event occurs. The types of resources required will be  
1050 determined by the pre-approved monitoring or research plan. Timing can be critical, as much of the  
1051 forestry monitoring or research evidence can quickly fade away or be lost during restoration activities or  
1052 other management activities. Once a rare or large event has occurred, the following procedure will be  
1053 implemented:

1054

1055 ( 1 ) Determine that the rare event has occurred; the authority to make this determination will be  
1056 the EMC.

1057 ( 2 ) After review of the rare or large event, a pre-approved study plan will be reviewed and  
1058 modified to best match the conditions that resulted from the rare or large event. Minor  
1059 adjustments to the monitoring or research plan can be made and then executed without  
1060 delay.

1061

1062

1063

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### 1065 **4.3.2 Anadromous Fish Monitoring**

1066

1067 Anadromous fish are those species that reside most of their adult life in the ocean and return to  
1068 freshwater to spawn. However, juveniles and adults of some species may hold in freshwater for  
1069 extended periods while others spend more of their life history in the ocean. Chinook and coho salmon  
1070 and steelhead trout in California have complex life cycles, not only among the different species, but also  
1071 among the different runs of species. Fisheries managers typically monitor adult escapement and juvenile  
1072 outmigrants to determine the status and trends of fish populations. State, federal, and local agencies,  
1073 tribes, and various private entities and landowners have collected and some are currently collecting fish  
1074 population data in California. Available data varies from long-term and abundance data to data that are  
1075 typically limited spatially and temporally. Determining impacts to fish populations requires intensive,  
1076 multi-year monitoring, as trends may not be determined for many years due to high natural variability  
1077 as well as the complexity of fish life cycles. Due to the complexity of fish life cycles, the quality and/or  
1078 abundance of available data, and other confounding factors (such as climate change, ocean conditions,  
1079 predator-prey dynamics, etc.), it may be difficult to make any correlations between timber harvesting  
1080 impacts or restoration projects to fisheries populations, particularly at a reach or watershed scale.

1081 Similarly, fishery biologists and other resource professionals monitor stream habitat parameters and  
1082 indicators such as habitat typing, benthic macroinvertebrate assemblages, spawning substrate, stream  
1083 temperature, suspended sediment, flow regimes, turbidity, and riparian vegetation to make inferences  
1084 about project impacts to fish populations. As with monitoring fish populations, this type of monitoring is  
1085 widely conducted across California by government agencies and private entities using accepted  
1086 protocols. Habitat data are relatively easy to collect, less costly, and less intensive than fish population  
1087 monitoring. It is also easy to document any changes, either positive or negative, from timber harvesting  
1088 or restoration projects on a reach or watershed scale within a short time frame. Various types of stream  
1089 habitat monitoring allow managers to make inferences on potential impacts to fish populations from  
1090 timber operations. For these reasons, the EMC will focus primarily on stream habitat monitoring and,  
1091 when available, will use fish population data as a basis to evaluate the effectiveness of specific FPRs and  
1092 associated regulations.

1093

### 1094 **4.4 Scientific Uncertainty**

1095

1096 The Board recognizes there is overall scientific uncertainty concerning how forested ecosystems  
1097 function within the framework of managed forestlands. There is also uncertainty in how various  
1098 ecosystem components and processes might relate to one another. Therefore, the EMC and Board  
1099 recognize that while we will attempt to increase our scientific understanding of ecosystem components  
1100 or processes in managed state and private forestlands, we may never fully understand these processes.  
1101 Even with these known uncertainties, the EMC and Board will pursue a better understanding of the  
1102 effectiveness of FPRs and associated regulations.

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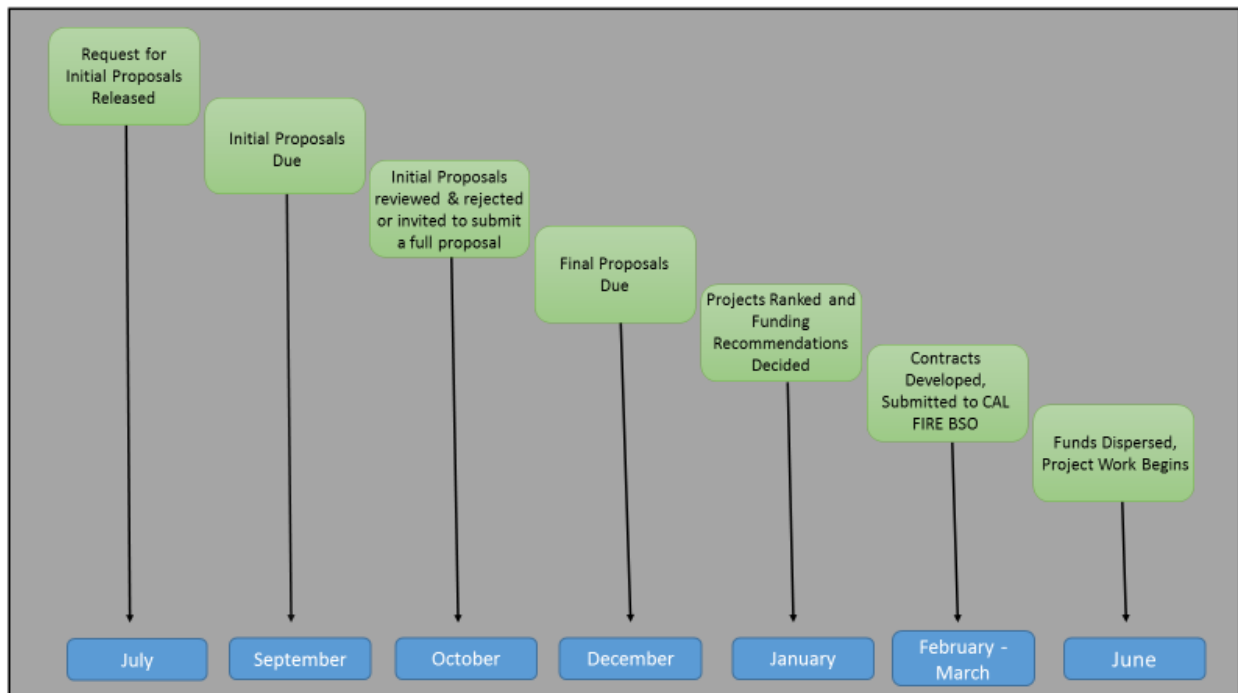
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## 5.0 EMC Project Development and Management

Projects will be solicited through a once-a-year Request for Proposal (RFP) generated after the start of the fiscal year on July 1<sup>st</sup>. A RFP can be found on the EMC web site. Initial Concept Proposals will be solicited with a specified date and time by which submissions must be received by the Board. All proposals must be submitted on the standard form that the Committee has developed.

The EMC will conduct a preliminary technical review of all Initial Concept Proposals that are received by the due date (which is typically in September). This review will consider the completeness of the proposals and whether they are within the scope of the Themes and Critical Monitoring Questions elaborated in the Strategic Plan in Section 2.4. The EMC will work with Board staff to screen proposals for any conflicts of interest. The EMC may request the Principal Investigator to provide additional information within a reasonable period. When the EMC determines that an Initial Concept is complete and within scope, it will invite the Principal Investigator to submit a Full Project Proposal by a specified date (which is typically in December or January).

**Figure 6. EMC Project Solicitation, Submission, Selection, and Funding Timeline.**



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**1130 Conflict of Interest**

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1132 As an advisory committee under the oversight of the Board, members of the EMC may be perceived as  
1133 quasi-public officials even though the committee lacks decision-making authority. As such, it is  
1134 important that the members be aware of and avoid potential conflicts of interest, and even the possible  
1135 perception of a conflict of interest. Generally, members must avoid participating in or influencing any  
1136 decision in which they have a direct or indirect financial interest or other personal interest. The  
1137 California conflict of interest rules that may apply to a particular member, or in a particular situation,  
1138 can be very complex. If any questions or concerns arise regarding a potential conflict of interest, EMC  
1139 members should seek guidance from the Board’s legal counsel.

1140  
1141

**1142 Project Ranking Method**

1143  
1144 The EMC will conduct thorough technical review of all Full Project Proposals that are received by the due  
1145 date. This review will consider the completeness of the proposals and whether they are within the  
1146 scope of the Themes and Critical Monitoring Questions elaborated in the Strategic Plan in Section 2.4.  
1147 Principal Investigators will be invited to present and discuss their proposals at an EMC meeting. If  
1148 needed, the EMC may request the Principal Investigator to provide additional information within a  
1149 reasonable period. When a Full Project Proposal is deemed complete and ready for ranking, EMC  
1150 members will rank the proposal according to the ranking process. EMC members will individually rank  
1151 each project and the average ranking score will be calculated for each project. No specific minimum  
1152 average ranking score is required for support; rather, individual project scores will be considered  
1153 relative to other project scores.

1154  
1155 Once all of the Full Project Proposals for the annual project cycle have been ranked, the EMC members  
1156 will vote to make recommendations for allocation of available EMC funds to the Proposals, taking into  
1157 consideration the project ranking score, how well the project tests the effectiveness of the FPRs, and the  
1158 reasonableness of the requested budget. The EMC may decide to recommend funding a proposal in full,  
1159 in part, or not at all. The Board will make the final funding decision.

1160  
1161 It is the intent of the EMC to keep the ranking process transparent, with the ranking done in an easily  
1162 trackable manner. The ranking will take place during regular, public meetings of the EMC. Subsequent  
1163 to ranking actions, both written notes of the meeting and ranking results are published on the Board’s  
1164 website. Project Principal Investigators will be notified of their project ranking, and any comments  
1165 regarding their project referred to them from the Committee. EMC members who are the Principal  
1166 Investigator or Collaborator on a project will recuse themselves from ranking their proposal.

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**1170 Ranking Category Summaries**

1171

**1172 Critical Question**

1173 Projects that address multiple EMC critical themes and multiple critical questions within a given theme  
1174 will be ranked higher than those that only address a single theme and critical question. Additionally,  
1175 projects must describe appropriate study design and methods to adequately address the proposed  
1176 critical question(s), and approximate time frame to conclude results that may be used by the Board to  
1177 use an evidence-based approach in rule revision(s).

1178

**1179 Scientific Uncertainty**

1180 Projects will be ranked higher when our current scientific understanding of forest practice effectiveness  
1181 in the FPRs and associated regulations is incomplete. A goal is to promote projects that address large  
1182 gaps in the knowledge of the effectiveness of the FPRs and associated statutes and regulations. Projects  
1183 should propose to investigate high priority critical monitoring themes (Strategic Plan Section 2.4).

1184

**1185 Geographic Application**

1186 Proposed projects that have broad application throughout California forestlands both public and private  
1187 will be ranked higher than those with application limited to a specific geomorphic region or sub-region.  
1188 Projects need not be physically located throughout California to produce findings that apply to multiple  
1189 areas in the state.

1190

**1191 Collaboration & Feasibility**

1192 Projects will receive higher ranking when they have a broad array of collaborative partners involved with  
1193 substantive expertise in the proposed study. This is to encourage multidisciplinary approaches in the  
1194 proposals. Project proponents are encouraged to collaborate with state and federal agencies,  
1195 universities, private industry, NGOs, watershed groups, etc. Past performance in delivering timely,  
1196 acceptable monitoring reports within available budgets will be considered.

1197

**1198 EMC Funding Request**

1199 We report the amount of EMC funding requested for information; it is not a ranking criterion. The  
1200 proposed monitoring projects need to describe existing collaboration and funding that will ensure  
1201 achieving goals and objectives of monitoring. Also, the proposals need to clearly state funding  
1202 requested from the EMC. Project proponents shall provide the information on the requested funding in  
1203 proportion to the total project budget.

1204 **RANKING OF PROPOSED EFFECTIVENESS MONITORING PROJECTS<sup>2</sup>**  
 1205

Project Number	Project Title	Critical Question	Scientific Uncertainty	Geographic Application	Collaboration & Feasibility	Overall Ranking	EMC Funding Request (not included in ranking score)
Example: EMC-15-001							

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**Ranking Method for Monitoring Projects**

**Critical Question:** Proposed monitoring project addresses one or more EMC critical monitoring questions with appropriate study design and experimental methods.

**Scientific Uncertainty:** Current scientific understanding is not well-studied or validated. This ranking is weighed twice (2 times) the weight of other rankings.

**Geographic Application:** Critical question and proposed project has broad geographic application.

**Collaboration & Feasibility:** Number of active contributing collaborators relative to the monitoring subject. Consider the magnitude and expertise of the collaborators. Feasibility of monitoring project to meet stated goals and objectives within expected budget and timelines needed by the EMC, Board or stakeholders.

On a categorical scale of 1 to 5, reviewers should refer to the following guidance when reviewing any category:

- 1 = Does not meet any portion of the Ranking
- 2 = Does not meet key portions of the Ranking
- 3 = May meet some portions of the Ranking, either key or ancillary
- 4 = Meets key portions of the Ranking and does not address ancillary portions

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<sup>2</sup> The metrics used for ranking EMC projects were modeled on the Cooperative, Monitoring, Evaluation and Research Committee (CEMR) (established by the State of Washington Forest Practices Board) general method for ranking projects. This was deemed prudent during the initial formation of the EMC as CEMR is roughly similar in scope and mission as the EMC, and is a well respected governmental advisory committee. (<https://www.dnr.wa.gov/about/boards-and-councils/forest-practices-board/cooperative-monitoring-evaluation-and-research>).

1234 Project Management

1235 Board, agency and EMC staff will work closely with Principal Investigators to manage the current and  
1236 ongoing project workload. Staff will report out on progress at each EMC meeting. Co-chairs will brief the  
1237 Board during EMC updates as needed.

1238

1239 Contract Development and Administration

1240 Contracts will be developed by Board staff under the guidance of the CAL FIRE contracting staff. It is  
1241 critical that project selection be completed as early as possible in the fiscal year to ensure that contract  
1242 deadlines can be met and funds encumbered in the appropriate fiscal year.

1243

1244 Status and Progress Reports

1245 Principal Investigators will provide yearly updates on status and progress. In person reports may be  
1246 requested by the EMC at committee meetings.

1247

1248 EMC Scientific Reports

1249 Members of the EMC or principal investigators conducting monitoring will synthesize the results into  
1250 final reports for the EMC. The reports shall include descriptions of purpose and need, scientific  
1251 methods, results and technical analysis, evaluation of implications for resources and forest management  
1252 operations, and disclosure of any possible limitations of results and any scientific uncertainty. The  
1253 reports shall not provide policy or regulatory recommendations, other than ideas for potential further  
1254 refinement of study methods to address any significant limitations and remaining scientific uncertainty.  
1255 All final reports will be made available to the public on the EMC webpage.

1256

1257 All reports shall discuss the statistical, physical and biological relevance of the monitoring and results.  
1258 Due to relatively small sample sizes and lack of controls for both dependent and independent variables  
1259 associated with "specific question" studies, statistically rigorous testing of water quality, aquatic habitat  
1260 and wildlife resource questions is often difficult. However, well developed resource monitoring  
1261 questions can improve scientific monitoring designs so that they limit spurious results and enhance the  
1262 range of inference. Both statistical and biological relevance of the monitoring and the resulting  
1263 acceptable level of scientific uncertainty should be clearly stated in each monitoring proposal and final  
1264 report.

1265

1266 Development of possible rule language options based on results and findings of EMC reports, if  
1267 necessary, shall be proposed by or brought before the Board's Forest Practice Committee (FPC) for  
1268 review and comment prior to submittal to the full Board.

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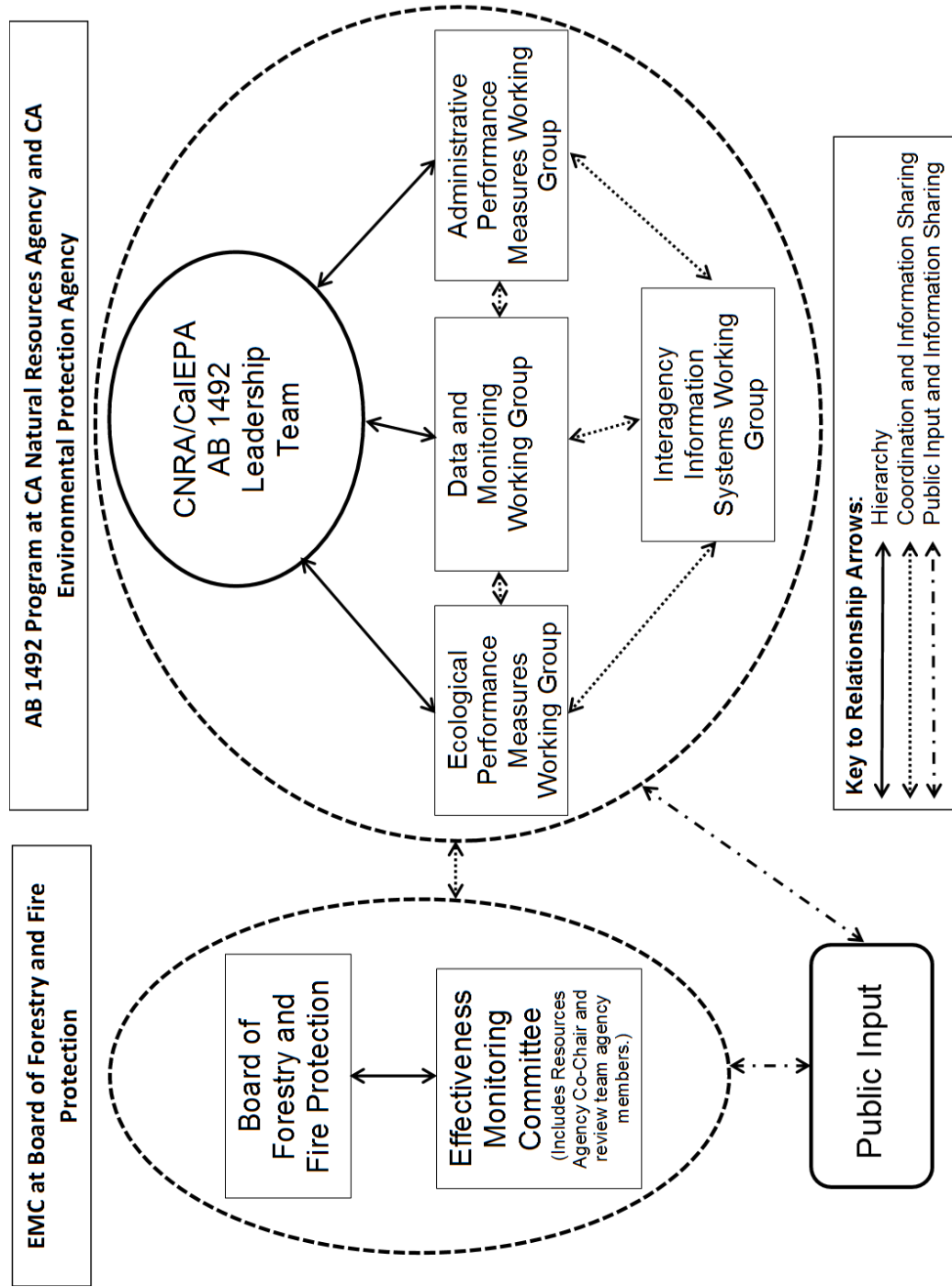
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1604 APPENDIX A: ORGANIZATIONAL FRAMEWORK OF AB 1492

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1606 Figure A-1.

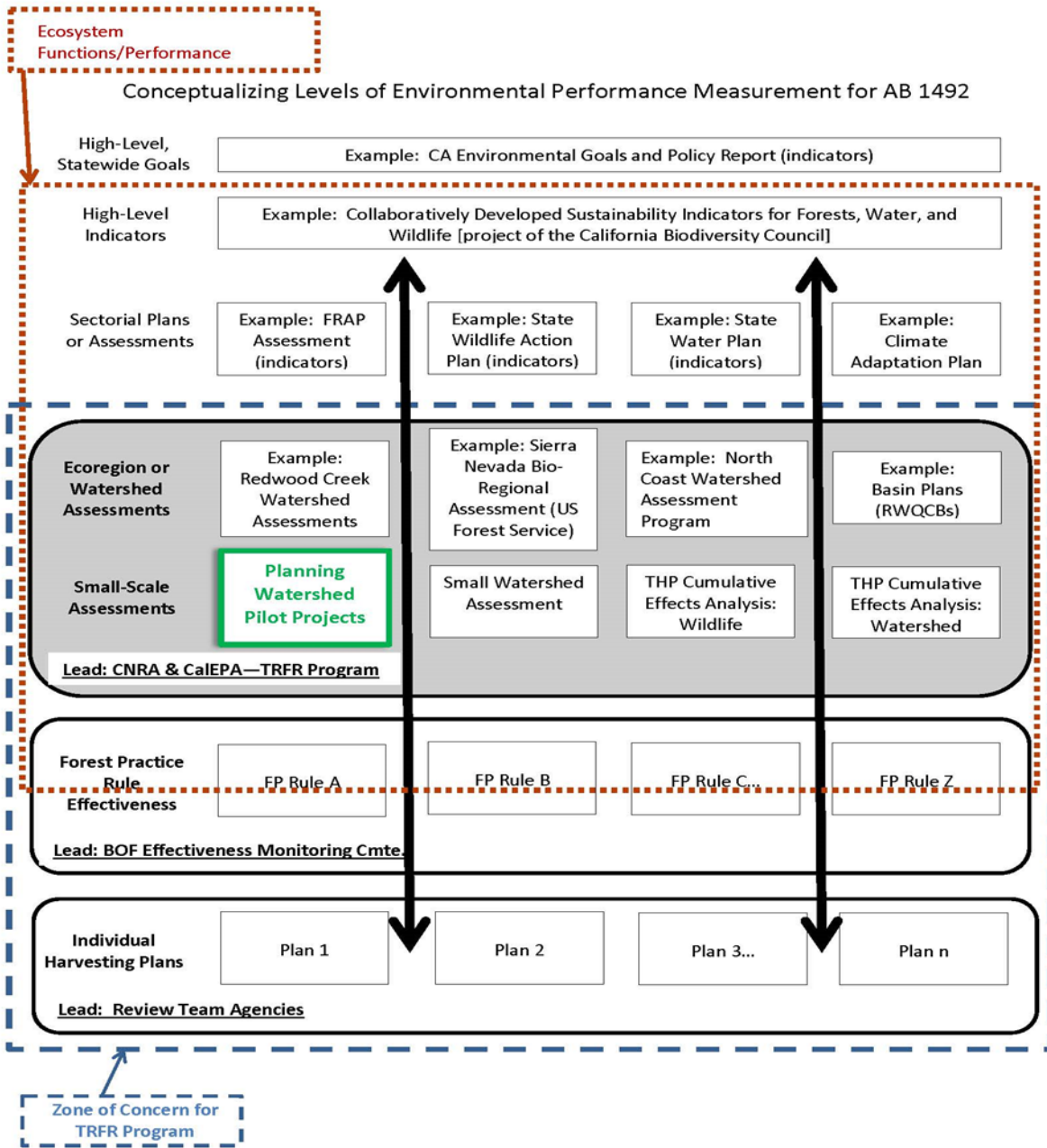


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**Figure A-2.**



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1615 **APPENDIX B: ADAPTIVE MANAGEMENT FRAMEWORK & RESPONSIBILITIES**

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Framework Responsibility	Adaptive Management Responsibilities
EMC	<p><b>Overall Scientific or Policy Relevance</b></p> <ol style="list-style-type: none"> <li>1. Does the study better inform understanding of effectiveness of FPRs?</li> <li>2. Does the study better inform understanding of Water Quality Objectives and Fish and Wildlife Code or regulations?</li> <li>3. Does the study contribute to understanding achievement of numeric or performance targets set by agencies or departments?</li> </ol>
	<p><b>Overall quality of the study design and results</b></p> <ol style="list-style-type: none"> <li>1. Was the study design and analysis of results consistent with EMC recommendations?</li> <li>2. Are study results scientifically relevant and significant?</li> </ol>
	<p><b>Confidence in results explaining effectiveness of FPRs</b></p> <ol style="list-style-type: none"> <li>1. What is our previous scientific understanding and how have the results better informed our current scientific understanding?</li> <li>2. What scientific uncertainty remains in our current understanding?</li> <li>3. What is the relationship between this study and others that may be planned, underway or recently completed?</li> <li>4. Feasibility of obtaining additional information to better inform policy and what will the additional information provide?</li> <li>5. What will additional information or studies cost and timelines for completion?</li> </ol>
BOARD	<p><b>Review scientific results and additional EMC information</b></p> <ol style="list-style-type: none"> <li>1. Develop appropriate management policy from information provided by EMC.</li> <li>2. If management policy action is necessary, identify options and determine how feasible each option is from an operational and regulatory perspective.</li> <li>3. If Board action is necessary, identify whether appropriate for Committee development or full Board review.</li> </ol>

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1619 **APPENDIX C: PRIORITIES RECEIVED FROM BOARDS, AGENCIES AND**  
1620 **STAKEHOLDERS**

1621 **Board of Forestry and Fire Protection**

1622 The Board is required to develop and maintain a system of forest practice regulations applicable to  
1623 timber management on state and private timberlands. Public Resource Code (PRC) § 4551 requires the  
1624 Board to "...adopt district forest practice rules... to ensure the continuous growing and harvesting of  
1625 commercial forest tree species and to protect the soil, air, fish, wildlife, and water resources...", while  
1626 PRC § 4553 requires the Board to continuously review the rules in consultation with other interests and  
1627 make appropriate revisions.

1628

1629 In order to assist the Board in the maintenance of its regulations, the Board annually distributes an  
1630 Annual Call for Regulatory Review to the regulated public and agency representatives. This process  
1631 allows the Board to accept written and oral comments from stakeholders on issues of interpretation,  
1632 compliance, clarity, and inefficiency of the FPRs. The culmination of this process results in the Board's  
1633 standing committees annually modifying their priorities depending on severity of issues and problems  
1634 facing California's landscapes. For the most recent version of standing committee priorities, please see  
1635 Appendix A of the Board Annual Report located here: <http://www.bof.fire.ca.gov/>

1636

1637 In addition to the FPRs, the Board has established several joint policies with the California FGCom that  
1638 should be considered when setting monitoring priorities. These joint policies include Pacific Salmon and  
1639 Anadromous Trout (FGCom 2009); Hardwoods (FGCom 1994<sup>b</sup>); and Pre, During and Post Fire Activities  
1640 and Wildlife Habitat (FGCom 1994).

1641

1642 The EMC is a relatively new addition to the Board's structure. EMC funding is directed at projects that  
1643 directly test the FPRs and can inform the Board on the efficacy of their existing regulations. It is the  
1644 Board's vision that the findings of EMC funded projects will assist in the future development and  
1645 maintenance of both policy and regulatory schemes to further the mission of the Board.

1646

1647 The Board understands that natural processes are complex and highly variable over time and space, and  
1648 also that the current knowledge of these processes and their linkages are imperfect. However, it is also  
1649 known that on-site control of potential impacts offers the most direct and rapid mitigation of potential  
1650 impacts, and monitoring the effectiveness of these controls provides the best opportunity to increase  
1651 our understanding of cause-and-effect relationships (i.e. linkages) between management and potential  
1652 impacts to public trust resources. If potential adverse impacts are minimized at the local scale, there  
1653 should be reduced potential cumulative effects at a larger scale (MacDonald 2000). To attempt to  
1654 address cumulative effects the Board made three recommendations relevant to the EMC: (1) focus on  
1655 effectiveness monitoring activities to support adaptive management approaches (MacDonald 2000), (2)  
1656 research new computer modeling to improve analysis (Benda et al. 2007), and (3) improve collection of  
1657 information from on-going analysis to create watershed databases for agencies and public use. The  
1658 Board supports EMC efforts focusing upon project review, funding, tracking, and reporting to assist the  
1659 Board in addressing Board and committee priorities.

**1660 California Department of Fish and Wildlife**

1661 CDFW suggests a number of FPRs have long warranted monitoring for their effectiveness in ensuring  
1662 timber operations do not cause or aggravate significant direct or cumulative effects on the environment  
1663 and help to conserve public trust resources. In particular, there is a paucity of information collected on  
1664 the FPRs effectiveness regarding direct and cumulative effects on terrestrial wildlife resources. These  
1665 include FPRs intended to protect sensitive and other special-status species, maintain and recruit key  
1666 habitat elements (e.g., snags), maintain late-succession forest stands, and avoid habitat fragmentation  
1667 and/or maintain habitat connectivity. The effectiveness of the FPRs, individually and cumulatively should  
1668 be effective in meeting the objectives stated under 14 CCR § 897 "Implementation of the Act Intent",  
1669 including:

1670  
1671 "(B) Maintain functional wildlife habitat in sufficient condition for continued use by the existing wildlife  
1672 community within the planning watershed and, (C) Retain or recruit late and diverse seral stage habitat  
1673 components for wildlife concentrated in the WLPZs and as appropriate to provide functional  
1674 connectivity between habitats."

1675  
1676 Additionally, many FGC statutes and FGCom policies apply to timber operations regulated by the FPRs.  
1677 For example, FGC statutes that provide CDFW with authority over lake and streambed alterations (FGC §  
1678 1600 *et seq.*), over species designated as threatened or endangered under the California ESA (FGC §  
1679 2050 *et seq.*), and over pollution (FGC § 5650 *et seq.*) are commonly encountered during review of Plans.  
1680 In addition, policies set forth by the FGCom, such as the Raptor Policy, guide CDFW activities and  
1681 coincide with the intent of the FPRs (FGC § 703 *et seq.*). Overall, effective FPRs, FGC statutes, and  
1682 FGCom policies related to fish and wildlife values should support forest ecosystem function, structure,  
1683 and species composition within defined ranges that constitute properly functioning conditions.

1684

**1685 State and Regional Water Quality Control Boards**

1686 The Water Boards' priorities are to participate in and support monitoring designed to increase our  
1687 understanding of the effectiveness of FPRs and associated regulations in protecting the beneficial uses  
1688 of water from existing and potential impacts of forest management. Monitoring studies should be  
1689 designed to evaluate the effectiveness of specific FPRs and the associated regulations' effect on long-  
1690 term watershed trends. Studies can also facilitate adaptive management to improve water quality  
1691 protection provided by the FPRs and associated regulations.

1692  
1693 While modern forestry practices have substantially improved since the passage of the Z'Berg-Nejedly  
1694 FPA in 1973 (Board 2014b), the cumulative effects of past and ongoing land uses have degraded the  
1695 ecological condition of aquatic ecosystems and beneficial uses of water in forested watersheds  
1696 throughout the state. In response, the Water Boards' priorities, as directed by the Porter Cologne  
1697 Water Quality Control Act and policies such as the Anti-degradation Policy (Resolution 68-16), are to  
1698 restore impaired waterbodies and their watersheds and to protect those waterbodies that are not  
1699 impaired.

1700

1701 To that end, it is necessary to evaluate the effectiveness of the FPRs and associated regulations in  
1702 sustaining or improving aquatic ecosystem and watershed conditions, as measured through factors such  
1703 as: preventing or minimizing sediment discharge; restoring impaired aquatic and riparian function; and



1704 preserving and restoring cold water for beneficial uses through retaining and enhancing effective shade  
1705 on watercourses. In order to meet these needs, the spatial and temporal scale of monitoring will vary  
1706 from short-term site-specific or project-specific, to long-term watershed or regional scales. Additional  
1707 studies and methods are needed to evaluate known or suspected water quality factors in timberland  
1708 watersheds, such as fuel loading in WLPZs, changes to vegetation community diversity, effects of road  
1709 system design alternatives and road density, effects of large scale canopy reduction on a catchment  
1710 scale, fuel breaks encroaching into riparian zones, and management practices applied during and after  
1711 timber harvest activities in wildfire-affected areas.

1712

1713

### 1714 **California Natural Resources Agency**

1715 The mission of CNRA is “To restore, protect and manage the state's natural, historical and cultural  
1716 resources for current and future generations using creative approaches and solutions based on science,  
1717 collaboration and respect for all the communities and interests involved.” CNRA provides the primary  
1718 leadership for the AB 1492 Timber Regulation and Forest Restoration Program, working in close  
1719 collaboration with the timber harvest Review Team agencies and the California Environmental  
1720 Protection Agency. Relevant to the functions of the EMC, AB 1492 includes:

- 1721 • Legislative intent to “Promote transparency in regulatory costs and programs through the  
1722 creation of performance measures and accountability for the state’s forest practice regulatory  
1723 program and simplify the collection and use of critical data to ensure consistency with other  
1724 pertinent laws and regulations.” [Public Resources Code § 4629.2(f)].
- 1725 • A requirement for regular reporting to the Legislature that includes evaluating ecological  
1726 performance. [Public Resources Code § 4629.9(a)(8)(F)]

1727

1728 Evaluation of the effectiveness of the Forest Practice Act (FPA) and Rules and other related timber  
1729 harvesting statutes and regulations, the role of the EMC, is a very important element in achieving these  
1730 directions from AB 1492. The EMC’s creative, scientific, collaborative approach also is consistent with  
1731 the CNRA mission statement.

1732

### 1733 **California Geological Survey**

1734 CGS priorities focus on increasing our understanding of the FPRs effectiveness with regard to mass  
1735 wasting, erosion, fluvial processes, and the construction techniques used for facilities such as roads,  
1736 landings, and watercourse crossings. Management activities that affect these geologic processes have  
1737 the potential to create local and cumulative effects to resources, and in some cases public safety. Due  
1738 to the diverse geologic, topographic, and climatic conditions across the state, forest management  
1739 activities also have the potential to result in different levels of impact in specific terrain (e.g., steep  
1740 convergent slopes vs. gentle convex slopes), in different portions of the state (e.g., areas with high  
1741 rainfall and weak geologic materials vs. areas with lower rainfall and strong geologic materials), as well  
1742 as when the activities are conducted (e.g., during the winter vs. the summer), and what activities are  
1743 conducted (e.g., tractor vs. cable harvesting; road construction vs. no road construction; or, selection vs.  
1744 clearcut silviculture). Where and when forest management activities are conducted, as well as the  
1745 practices employed, are critical to FPRs effectiveness. Monitoring activities that evaluate the geologic  
1746 and construction practices above must take into account the geographic and temporal conditions where

1747 they are employed, and recognize that stochastic events (such as significant storms, rain-on-snow  
1748 events, large earthquakes, and large wildfires) often have profound effects on the landscape. These  
1749 events will also have a significant effect on the results of monitoring activities (e.g., monitoring during a  
1750 drought vs. monitoring following a 20-year recurrence interval storm). Effective FPRs will address forest  
1751 management activities such that geologic-related impacts are reduced to less than significant. To  
1752 achieve this, geologic-related monitoring studies must include the range of short-term to long-term, of  
1753 site-specific to regional scales, as well as response to episodic rare or large events.

1754  
1755 Beyond geologic focused monitoring, aquatic and terrestrial effectiveness monitoring should also  
1756 identify what appropriate temporal scale or specific rare and large events which may need identification  
1757 as part of effectiveness monitoring. Identifying the appropriate temporal scale will assist in separating  
1758 effectiveness of current FPRs versus potential impacts from forest management legacies (see Section  
1759 4.3). Additionally, identifying rare and large events like landslides and floods or impacts from drought,  
1760 disease or wildfire can assist in separating effectiveness of current FPRs and associated regulations.  
1761 Most importantly, some specific FPRs may need to be evaluated for effectiveness following both forest  
1762 management operations and rare or large events (see Section 4.3.1).

1763

#### 1764 **California Department of Forestry and Fire Protection**

1765 CAL FIRE monitoring priorities are to evaluate the implementation (i.e., compliance) and effectiveness of  
1766 the FPRs. High priority topics include monitoring impacts to water quality, as has been undertaken since  
1767 1996, wildlife habitat for Board-listed sensitive species, and adequacy of fuel treatments for reducing  
1768 fire spread and intensity.

1769

1770 Specifically, CAL FIRE encourages the EMC to undertake specific projects to determine the FPRs  
1771 effectiveness related to Watercourse and Lake Protection Zone (WLPZ), road, and watercourse crossing  
1772 requirements in maintaining acceptable sediment entry, water temperature regimes, and nutrient  
1773 inputs. Monitoring of roads and watercourse crossings following large hydrologic events is needed to  
1774 test the effectiveness of contemporary forest practices. Additionally, monitoring of unstable area  
1775 identification and unstable area prescription effectiveness is required. The effectiveness of the current  
1776 FPRs for meeting Basin Plan water quality objectives should also be an EMC priority.

1777

1778 Interactions between riparian conditions and in-stream nutrient dynamics must be better understood to  
1779 appropriately manage riparian zones. Improved understanding is needed on how differences in riparian  
1780 stand structure and composition affect seasonal light levels and nutrient availability, which influence  
1781 primary production and thus salmonid production. On-going debate over appropriate levels of timber  
1782 harvest in riparian zones make this a high priority research item for CAL FIRE. Factors affecting  
1783 headwater stream temperatures also need to be better understood, particularly related to effectiveness  
1784 of FPR protection measures for Class II watercourses.

1785

1786 Wildlife habitat effectiveness monitoring should also be a high priority for the EMC. CAL FIRE encourages  
1787 the EMC to develop monitoring projects to determine the effectiveness of measures used to ensure take  
1788 avoidance and prevention of significant adverse impacts for Board-listed sensitive and other important  
1789 species. CAL FIRE will work through the EMC to collaborate with the other agencies on current wildlife  
1790 monitoring efforts and to develop new monitoring approaches for sensitive species.

1791  
1792 With the Governor’s recent (2018) goal of doubling the total statewide rate of forest treatments within  
1793 five years to at least 500,000 acres per year for improving forest health and resilience, monitoring of fuel  
1794 treatment practice compliance and effectiveness has become a high priority for CAL FIRE. This includes  
1795 monitoring both operations conducted with plans undergoing multi-agency review, and those  
1796 undertaken with Exemption and Emergency (EX-EM) Notices. After leading a multi-agency EX-EM notice  
1797 pilot monitoring project in 2018, CAL FIRE will develop an ongoing program to monitor the effectiveness  
1798 of the resource protection provisions in the FPRs for EX-EM Notices.  
1799

### 1800 **USDA Forest Service**

1801 The USDA Forest Service Pacific Southwest Research Station (PSW) supports testing and monitoring the  
1802 ability of the California FPRs to mitigate adverse effects on the environment from timber harvesting. As  
1803 a world leader in natural resources research, PSW conducts and supports research in four key focus  
1804 areas: (1) providing clean and reliable water resources, (2) enhancing benefits to urban communities  
1805 from the natural environment, (3) sustaining ecological resources and services, and (4) creating  
1806 landscapes that are resilient to disturbances such as timber harvesting and wildfire. Within an adaptive  
1807 land management context, PSW supports EMC projects that evaluate if the FPRs are encouraging timber  
1808 harvesting procedures that reduce post-harvest erosion, provide wildlife habitat for threatened and or  
1809 endangered species including the Northern Spotted Owl, reduce adverse wildland fire behavior  
1810 potential, and mitigate smoke emissions when harvest areas are burned by wildfire.  
1811

### 1812 **National Marine Fisheries Service**

1813 The National Marine Fisheries Service (NOAA Fisheries) supports the Board's EMC charter goal of  
1814 ascertaining whether the FPRs and associated regulations maintain or enhance water quality and  
1815 aquatic habitat, particularly habitat that supports salmon and steelhead listed under the federal  
1816 ESA. NMFS also supports the overarching goal to create a unified effectiveness monitoring strategy to  
1817 serve as a “road map” for focusing effort on the most urgent issues.

1818 Seven species of salmon and steelhead are federally listed as threatened or endangered in  
1819 California. Timber harvest is identified as a contributing factor that negatively impacts these listed  
1820 species and their habitat. Recovery plans for these species recommend that the FPRs and associated  
1821 regulations be evaluated and, if needed, modified to achieve sufficient habitat condition and population  
1822 abundance necessary for recovery (NMFS 2012, NMFS 2014). NMFS encourages the Board to evaluate  
1823 the effectiveness of FPRs and associated regulations addressing the rate of timber harvest and  
1824 cumulative effects.

1825 Examining a single FPR may not be the most effective approach in determining the effectiveness of  
1826 regulating cumulative effects in all cases. Rather, examining a suite of FPRs and associated regulations  
1827 which are intended, collectively, to contribute to controlling cumulative effects may be more  
1828 informative. In addition, a proper examination of cumulative effects likely involves the study at site,  
1829 watershed, and regional scales by tracking trends in important indicators of species population health  
1830 and habitat condition. While cumulative effects may be avoided or minimized through site- or project-  
1831 level controls (such as those found at FPRs within 14 CCR § 916 [936, 956]) validating whether such

1832 controls are effective at avoiding significant cumulative effects, or the degree to which they are  
1833 minimized at various scales, is important for informed regulation of timber harvest in watersheds  
1834 supporting listed salmonids.  
1835

## 1836 **Public Stakeholders**

1837 For the purposes of this Strategic Plan, public stakeholders include members of the general public,  
1838 Native American tribes, private landowners, academics from universities, and a wide variety of interest  
1839 groups. Because no one person or entity can speak on behalf of all public stakeholders, this summary is  
1840 intended to describe input received to date from public stakeholders on the Strategic Plan. Since the  
1841 EMC welcomes continued input from public stakeholders, this section will be revised when the Strategic  
1842 Plan is updated approximately every three years.  
1843

1844 One consistent comment received from multiple conservation groups and individuals is to have work on  
1845 the EMC Strategic Plan, committee discussions, and public meetings as open and transparent as  
1846 possible. To meet this public expectation, all EMC meetings are publicly noticed with meeting agendas,  
1847 and previous meeting notes and other EMC documents are posted on the Board's website under the  
1848 EMC webpage. In addition, all EMC meetings are broadcast live via webinar with the goal of continuing  
1849 to improve internet broadcast of meetings and interaction with the public.  
1850

1851 Members of the public have encouraged the EMC to promote monitoring tools or protocols for  
1852 landowner-based project scale monitoring. Use of project scale photo point monitoring (e.g., CVRWQCB  
1853 2014) has been a useful tool for water quality monitoring (Board 2009) and may be appropriate for  
1854 specific EMC critical questions. In addition, the EMC is encouraged to pursue development of easy-to-  
1855 implement project-scale monitoring protocols to answer specific EMC critical monitoring questions  
1856 when such protocols do not exist.  
1857

1858 In general, public stakeholders support monitoring efforts that are well designed, advance our scientific  
1859 understanding of natural processes, and are re-integrated through adaptive management into the FPRs  
1860 and associated regulations. Accordingly, the EMC Strategic Plan places a strong emphasis on identifying  
1861 well designed scientific studies (Section 4.0) that will be able to inform review of existing FPRs through  
1862 an Adaptive Management Framework (Section 3.0).

1863 **APPENDIX D: CAL FIRE AND BOARD MONITORING AND REPORTING**  
1864 **REQUIREMENTS**

1865 The following is a list of the FPRs and current statutes with specific monitoring requirements to be  
1866 conducted by CAL FIRE and/or the Board.

1867 **Class II Watercourses**

1868 **14 CCR §§ 916.9 [936.9, 956.9] (g) (1) (C)** The Department shall report to the Board at least once  
1869 annually on the use and effectiveness of 14 CCR § 916.9 [936.9, 956.9] subsection (g) for as long as this  
1870 rule section remains effective. This section has undergone the rulemaking process and pending approval  
1871 by the Office of Administrative Law, the reporting requirement by the Department shall be struck from  
1872 the regulation. This was done to allow pending and forthcoming scientific studies on the efficacy of the  
1873 Class-II Large rules to come to fruition, to allow the Board decide whether to cancel or continue this rule  
1874 sections when results show the relative efficacy of these rules. Additionally, this takes the burden off the  
1875 Department that formerly required a yearly report to the Board, helping ease the heavy reporting  
1876 requirement that the Department holds on Board actions.

1877 **Maintenance and Monitoring of Logging Roads and Landings**

1878 **14 CCR §§ 923.7 [943.7, 963.7] (k) . . .** The Department shall also conduct monitoring inspections at least  
1879 once during the prescribed maintenance period to assess logging road and landing conditions.

1880 **Watercourse Crossings**

1881 **14 CCR §§ 923.9 [943.9, 963.9] (u) . . .** The Department shall also conduct monitoring inspections at  
1882 least once during the prescribed maintenance period to assess watercourse crossing conditions.

1883 **Aspen, meadow and wet area restoration**

1884 **14 CCR §§ 913.4 [933.4, 953.4] (e) (7)** The Department shall review post-harvest field conditions of the  
1885 portions of plans using the aspen, meadow and wet area restoration silvicultural prescription and  
1886 prepare a monitoring report every five (5) years for the Board. The monitoring report shall summarize  
1887 information on use of the prescription including:

- 1888 (i) The level of achievement of the measures of success as stated in the plan per 14 CCR §§  
1889 913.4, 933.4, and 953.4, subsection (e)(5);
- 1890 (ii) (ii) Any post-harvest adverse environmental impacts resulting from use of the prescription;
- 1891 (iii) Any regulatory compliance issues; and
- 1892 (iv) Any other significant findings resulting from the review. The review shall include photo  
1893 point records.
- 1894
- 1895

1896 **Modified THP for Fuel Hazard Reduction**

1897  
1898 **14 CCR § 1051.7** . . . The Department shall report to the Board at least once annually on the use and  
1899 effectiveness of 14 CCR §§ 1051.3-1051.7 for as long as these rule sections remain effective.

1900 **Site-specific measures or nonstandard operational provisions**

1901 **14 CCR §§ 916.9 [936.9, 956.9] (v) (10)** Board staff and the Department shall work with agencies,  
1902 stakeholders, and appropriate scientific participants (e.g., MSG, Technical Advisory Committee) in a  
1903 transparent process to: (1) describe and implement two pilot projects, including monitored results,  
1904 using site-specific or non-standard operational provisions; and (2) provide recommendations to the  
1905 Board for consideration for adoption to provide detailed guidance for the application of site-specific or  
1906 non-standard operational provisions. The pilot projects and guidance shall address cumulative and  
1907 planning watershed impacts, and the guidance may address the appropriate standards the site-specific  
1908 or non-operational provisions shall meet. A report on the progress of the pilot projects and  
1909 implementation guidance shall be presented to the Board within 18 months of the effective date of this  
1910 regulation.

1911 **Forest Fire Prevention Exemption Pilot Project**

1912 **14 CCR § 1038(j) (15)** At least one inspection conducted by the Director shall be made after completion  
1913 of operations.

1914 **14 CCR § 1038(j) (17)** The department shall maintain records regarding the use of the Forest Fire  
1915 Prevention Exemption Pilot Project exemption in order to evaluate the impact of it on fuel reduction and  
1916 natural resources in areas where it has been used.

1917 **PRC § 4584 (j) (11) (F)** The department shall maintain records regarding the use of the exemption  
1918 granted in this paragraph in order to evaluate the impact of the exemption on fuel reduction and natural  
1919 resources in areas where the exemption has been used.

1920 **PRC § 4584 (j) (12)** After the timber operations are complete, the department shall conduct an onsite  
1921 inspection to determine compliance with this subdivision and whether appropriate enforcement action  
1922 should be initiated.

1923 **Section 303(d) Listed Watersheds**

1924 **14 CCR §§ 916.12 [936.12, 956.12] (a)** The Department shall, in collaboration with the appropriate  
1925 RWQCB and SWRCB, prioritize watersheds in which the following will be done: 1) conduct or participate  
1926 in any further assessment or analysis of the watershed that may be needed, 2) participate in the  
1927 development of TMDL problem assessment, source assessment, or load allocations related to timber  
1928 operations, and 3) if existing rules are deemed not to be sufficient, develop recommendations for

1929 watershed-specific silvicultural implementation, enforcement and monitoring practices to be applied by  
1930 the Department.

1931 **14 CCR §§ 916.12 [936.12, 956.12] (b)** The Department shall prepare a report setting forth the  
1932 Department's findings and recommendations from the activities identified pursuant to (a) above. The  
1933 report shall be submitted to the Board and the appropriate RWQCB. The report shall be made available  
1934 to the public upon request and placed on the Boards' website for a 90-day period.

1935 **Protection of Habitable Structures Exemption, 2015**

1936 **14 CCR § 1038 (c) (6) (G)** The Department shall evaluate the effects of the exemption allowed under 14  
1937 CCR 1038(c)(6) including frequency and state-wide distribution of use acres treated, compliance,  
1938 professional judgment regarding post-treatment stand conditions observed relative to moderating fire  
1939 behavior and actual performance in the event of a wildfire. The Department shall, annually report its  
1940 findings based on this evaluation to the Board.

1941 **PRC § 4581 (i) (6)** The department shall evaluate the effects of this paragraph and shall report its  
1942 recommendations, before the paragraph becomes inoperative, to the Legislature based on that  
1943 evaluation. The report shall be submitted in compliance with Section 9795 of the Government Code.

1944 **Drought Mortality Amendments, 2015**

1945 **14 CCR § 1038 (k) (8)** The Department shall monitor and report on the statewide use of the exemption,  
1946 allowed under 14 CCR § 1038(k), including the number of harvest area acres, the areas of application  
1947 and the degree of compliance. The Department shall, within 180 days of the date that these emergency  
1948 regulations are filed with the Secretary of State, report its findings, to the Board.

1949 **Forest Fire Prevention Exemption**

1950 **14 CCR § 1038(i) (14)** At least one inspection conducted by the Director shall be made after completion  
1951 of operations. (This provision will likely be revised upon Board promulgation of regulation pursuant to  
1952 SB 901).

1953 **PRC § 4584 (j) (12)** After the timber operations are complete, the department shall conduct an onsite  
1954 inspection to determine compliance with this subdivision and whether appropriate enforcement action  
1955 should be initiated. (This provision will likely be revised upon Board promulgation of regulation pursuant  
1956 to SB 901).

1957 **Emergency Notice for Outbreaks of Sudden Oak Death Disease**

1958 **14 CCR § 1052.5** The Department shall track the number of Emergency Notices for outbreaks of SOD,  
1959 the acreage treated under the notices, and the WLPZ acreage treated under the notices, and report the  
1960 results to the Board bi-annually.

1961 **Conversion Exemptions**

1962 **14 CCR § 1104.1 (7)** The Department shall provide for inspections, as needed, to determine that the  
 1963 conversion was completed.

1964 **Exemptions and Emergency Notice Monitoring (PRC § 4589)**

1965  
 1966 During the 2016 Legislative Session, Assembly Bills 1958 (Wood) and 2029 (Dahle) were signed into law  
 1967 creating two new types of Exemptions from the THP requirements of the FPA. Additionally, the two bills  
 1968 directed CAL FIRE and the Board, with participation by the CDFW, RWQCBs, and the public, to provide  
 1969 the Legislature with a report on the various Exemptions and Emergency Notice permitting options  
 1970 authorized by the FPA and Rules. In the 2017 Legislative Session, the reporting requirements of AB 1958  
 1971 and AB 2029 were modified by a budget trailer bill, Senate Bill 92. This budget bill specified a new report  
 1972 due date of December 31, 2018, and added the requirement for, "...an analysis of exemption use,  
 1973 whether the exemptions are having the intended effect, any barriers for small forest owners presented  
 1974 by the exemptions, and measures that might be taken to make exemptions more accessible to small  
 1975 forest owners."

1976  
 1977 During the 2018 Legislative Session, Senate Bill 901(Dodd) again revised the reporting requirements  
 1978 under Public Resources Code § 4589. The reporting timeline was clarified to continue through December  
 1979 32, 2025, with an initial submittal of the report occurring on December 31, 2019. The requirement for  
 1980 identifying barriers to small forest owners for use of exemptions and recommended measures to make  
 1981 exemptions more accessible to small forest owners was repealed. The report shall now include  
 1982 recommendations to improve the use of those exemptions and emergency notice provisions,  
 1983 information on the linear distance of road constructed or reconstructed under notices of exemption by  
 1984 individual ownerships, within a representative sample of planning watersheds from each forest practice  
 1985 district. The report shall also contain the number of post-treatment onsite inspections that occur and  
 1986 whether those inspections were attended by a representative of the Department of Fish and Wildlife  
 1987 and a representative of the State Water Resources Control Board and the number and type of violations  
 1988 and enforcement actions taken. The final report due December 31, 2025, shall also include  
 1989 recommendations necessary for revisions to diameter limits at stump heights of harvestable trees for  
 1990 Small Timberland Owner and Forest Fire Prevention Exemptions.

1991  
 1992 Currently, data is being assimilated, and initial revisions of this report is underway with the first  
 1993 submittal expected in December of 2018.

1994  
 1995 **Required Inspections for Forest Fire Prevention Exemptions (Senate Bill 901, not yet in  
 1996 regulation)**

1997  
 1998 **PRC § 4584 (k) (11)** After the timber operations are complete, CAL FIRE shall conduct an onsite  
 1999 inspection to determine compliance with the FPRs and whether enforcement action should be initiated.  
 2000 CAL FIRE shall notify the appropriate Regional Water Quality Control Board, the Department of Fish and  
 2001 Wildlife, and the California Geologic Survey seven days prior to conducting the onsite inspection. The  
 2002 Regional Water Quality Control Board, the Department of Fish and Wildlife, and the California Geologic  
 2003 Survey may conduct an inspection with CAL FIRE.