EFFECTIVENESS MONITORING COMMITTEE

2024 ANNUAL REPORT & WORKPLAN

Submitted to the State Board of Forestry and Fire Protection

Approved: MONTH XX, 2025

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California State Board of Forestry and Fire Protection

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FULL 7(c)(i)

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EXECUTIVE SUMMARY

The Effectiveness Monitoring Committee (EMC) Annual Report and Workplan (Report) is updated and approved by the Board of Forestry and Fire Protection (Board) annually and is intended to catalogue the yearly accomplishments and status of ongoing EMC efforts. The Report summarizes EMC accomplishments, details EMC funding actions for the year, and provides an update of current EMC membership and staffing. For Fiscal Year (FY) 2024/2025, the EMC selected two proposed effectiveness monitoring projects to fund and support. Ongoing projects from prior years continued to be funded and supported; numerous project presentations were provided at four open public EMC meetings; the EMC revised its Charter (see past Charter EMC 2020, and Updated Charter EMC 2024a); and the EMC welcomed three new members and reappointed three members.

I. EMC PROCESS

The EMC was formed to develop and implement an effectiveness monitoring program to address both watershed and wildlife concerns, and to provide an active feedback loop to policymakers, managers, agencies, and the public to better assist in decision-making and adaptive management. As an advisory body to the Board, the EMC helps implement an effectiveness monitoring program by soliciting robust scientific research that addresses the effectiveness of these laws at meeting resource objectives and ecological performance measures related to AB 1492 (AB-1492 California Assembly 2011-2012[1]). In particular, the EMC funds robust scientific research aimed at testing the efficacy of the California Forest Practice Rules (FPRs) and other natural resource protection statutes, laws, codes, and regulations.

Four formal documents guide the activities and goals of the EMC:

(1) Charter (EMC 2024a);

(2) Strategic Plan (EMC 2022), which is updated approximately every three years;

(3) Annual Report and Work Plan (i.e., this report), which is updated every calendar year (see EMC 2024b for the most recent past report); and,

(4) Research Themes and Critical Monitoring Questions (CMQs) (EMC 2024g), which may be updated annually as determined necessary by the EMC.

All four documents are linked and interact in varying ways to guide the direction and activities of the EMC. The EMC reports on its activities in a variety of ways. The EMC Strategic Plan lays out how the Committee intends to achieve the EMC goals and objectives. This Annual Report and Workplan tracks progress on individual projects, documents the Committee's ranking and selection of proposed monitoring projects, and details other annual accomplishments and ongoing EMC efforts. The EMC conducts open meetings a minimum of four times per year (quarterly) to conduct EMC business, during which progress reports, final reports, or other presentations on EMC-funded projects or other related research may be provided. The EMC Co-Chair that also serves on the Board, or Board staff, may also report on the EMC's activities via verbal updates at Board meetings throughout the year.

[1] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201120120AB1492

EMC projects are solicited through an annual Request for Proposals (RFP) which is released following the start of the new FY (see **Figure 1**; also see the most recent RFP, EMC 2024c). The RFP, ranking, and selection process are detailed in the EMC's Strategic Plan (EMC 2022).

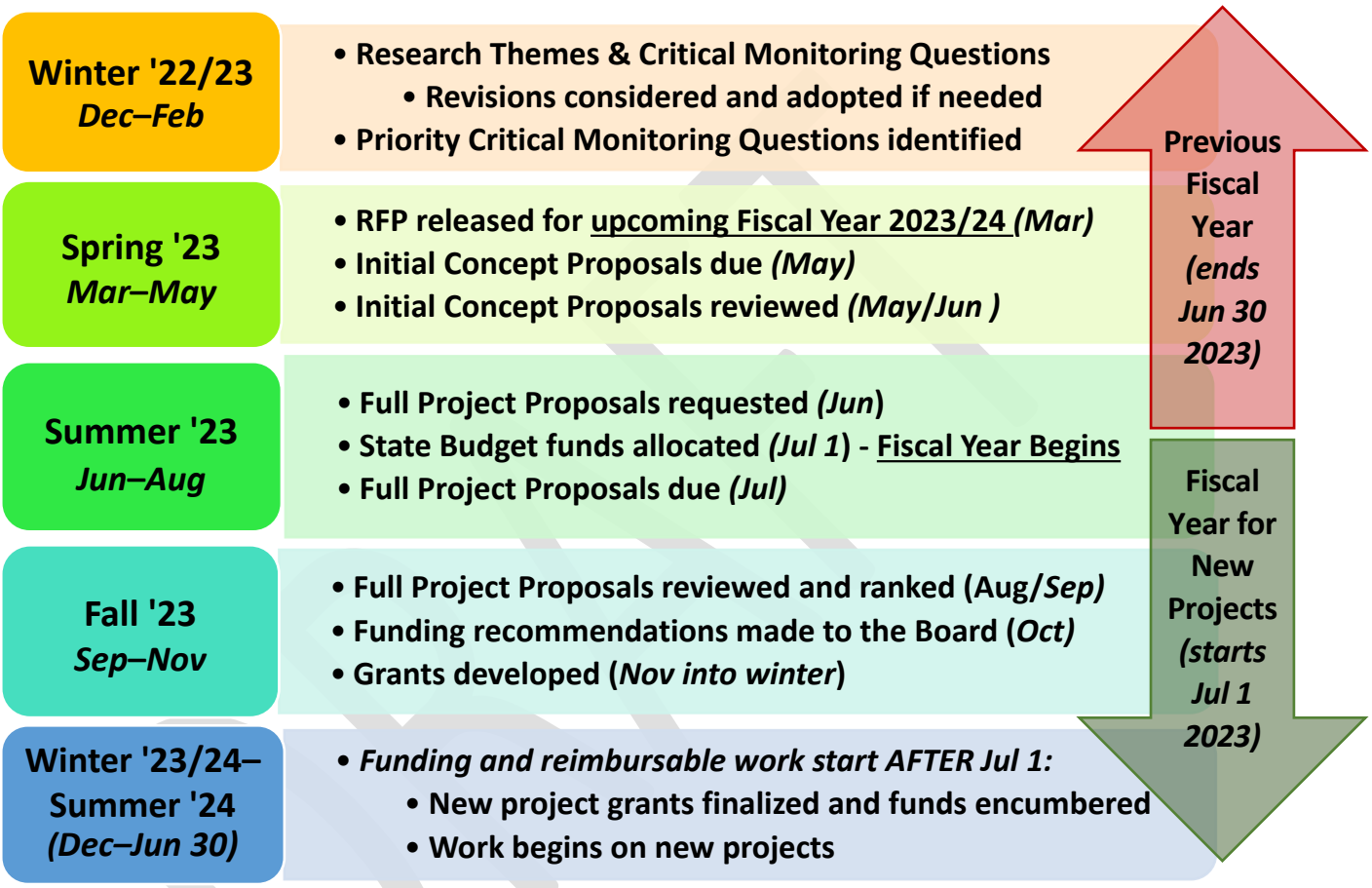

Figure 1. EMC Project Submission and Grant Processing Timeline – Example of Funding Cycle for Fiscal Year 2023/24. Key: RFP = Request for Proposals.

For FY 2024/25, the EMC's budget was reduced from the usual funding amount of $425,000 from the Timber Regulation and Forest Restoration Fund (TRFRF)—established by AB 1492—to $389,700, a reduction of $35,300. As such, the original RFP reflected a greater amount of estimated funding available to new projects. Of the allotted FY 2024/25 funds, $257,710 was allocated to support ongoing, previously awarded projects and $131,990 remained for new projects starting in FY 2024/25 after the budget reductions were considered (see **Table 2** in Section III. EMC SUPPORTED MONITORING PROJECTS – 2015 to 2024 for a list of active projects and funding status). The EMC anticipates an allocation of $425,000 in FY 2025/26 and subsequent years. EMC projects have an up to three-year performance period, and the EMC selected and budgeted for the proposed projects with funding terms ending June 30, 2027 based on this anticipated funding. This funding is allocated to projects through the Board/Department of Forestry & Fire Protection (CAL FIRE) grants department.

II. EMC MEMBERSHIP AND STAFF

The EMC has 17 mandated seats, including two co-chairs (one appointed from the Board), eight agency representatives, and seven monitoring community members. While not a mandated seat, one additional seat with a representative from the U.S. Forest Service (USFS) is also regularly occupied on the EMC. Additional staff support positions are provided by the Board, CAL FIRE, and other agencies (e.g., Water Boards). In 2024, the EMC welcomed three new members and three members were reappointed. Two seats remained unfilled on the EMC: one seat on the Monitoring Community, and one seat for a representative of the U.S. Fish and Wildlife Service (USFWS). One seat for a representative of the U.S. Forest Service (USFS) is currently filled by Member Dr. Drury and will be backfilled once an appropriate candidate can be found. More details on member terms and seats follows:

- The Board approved the EMC's recommendations for three new members at its September 26th meeting.
    - Givonne G. Law, Fuels Reduction Coordinator for East Bay Regional Parks District, filled an empty seat on the Monitoring Community, bringing her background in forest ecology and forestry to the EMC.
    - Izaac Russo joined the EMC as an agency representative of the North Coast Regional Water Quality Control Board. Member Russo brings experience in geology and water quality to the EMC, filling the seat behind James Burke.
    - Marjan Ghotbizadeh filled Jessica Leonard's seat as an agency representative of the State Water Resources Control Board, bringing a background in water quality and management.
- Terms for Members Dr. O'Connor, Dr. Love-Anderegg, and Chinnici—who sit on the Monitoring Community—expired in 2023 or 2024 and were reappointed by the EMC in 2024. The Board approved their recommended appointments at the March and July meetings.
- One seat on the Monitoring Community remains vacant as of July 2023. The agency representative seat for the USFWS has been vacant for many years, and Board staff continue to frequently reach out to this agency to recruit nominees. While currently filled, the USFS agency representative seat will be back-filled as soon as an appropriate candidate has been identified, nominated, and a public EMC vote can take place. Board staff reaches out to agency staff regularly to request nominees, and all seats are advertised frequently in the Request for Applicants (EMC 2024f), which is often updated and posted on the **EMC's webpage**[2] in the 'News' box, and on the **Board's webpage**[3] under the 'Latest' header.
- Member Dr. Forsburg-Pardi's term expires in January 2025, and if she will not be continuing with the EMC, Board staff will consult with the Board as to an appropriate replacement.

The updated Membership Roster is available online at EMC Members and Term Expirations (EMC 2024d). See **Table 1**, next page, for a list of membership and support staff in 2024.

[2] https://bof.fire.ca.gov/board-committees/effectiveness-monitoring-committee/
[3] https://bof.fire.ca.gov/

87 **Table 1. Current EMC Membership and Support Staff.**

Name	Specialty	Affiliation	Term End Date
Co-Chairs			
Drew Coe RPF #2981	Hydrology and Forestry	CAL FIRE	06/14/2027
Elizabeth ("Liz") Forsburg-Pardi, Ph.D.	Forest and Water Policy	Board of Forestry and Fire Protection (Board appointee) The Nature Conservancy	01/15/2025
Monitoring Community			
Michael Jones, Ph.D. RPF #3241	Forest Health and Disturbance Ecology	Forest Advisor Mendocino, Lake, and Sonoma Counties University of California Cooperative Extension	08/17/2026
Matthew Nannizzi	Aquatic Biology	Green Diamond Resource Company	11/02/2026
Sal Chinnici	Wildlife	Humboldt and Mendocino Redwood Companies	07/01/2024
Matthew O'Connor, Ph.D.	Geology and Geomorphology	Public, O'Connor Environmental	01/28/2028
Givonne G. Law	Forest Ecology and Forestry	East Bay Regional Parks District	09/26/2028
Leander Love-Anderegg, Ph.D.	Forest Ecology and Forestry	University of California, Santa Barbara	03/06/2028
VACANT *Formerly:* Peter Freer-Smith, Ph.D.	*Formerly:* Plant Ecology and Environmental Policy	*Formerly:* University of California, Davis	*Resigned 07/05/2023*
Agency Representatives			
Pending Open Seat Stacy Drury, Ph.D.	Fire Ecology	USDA Forest Service Pacific Southwest Research Station	n/a
Ben Waitman, Ph.D.	Wildlife	California Department of Fish and Wildlife	n/a
Clesi Bennett	Climate Change, Environmental Justice, and Natural Resources Policy	California Natural Resources Agency	n/a
Marjan Ghotbizadeh	Water Quality and Management	State Water Resources Control Board	n/a
Jonathan Meurer	Geology, Hydrology, and Water Quality	Central Valley Regional Water Quality Control Board	n/a
Clarence Hostler	Fisheries	National Oceanic & Atmospheric Administration National Marine Fisheries Service	n/a
Bill Short	Engineering Geology and Hydrogeology	California Geological Survey	n/a
Izaac Russo	Geology and Water Quality	North Coast Regional Water Quality Control Board	n/a
VACANT		U.S. Fish & Wildlife Service	n/a

Name	Specialty	Affiliation	Term End Date
Support Staff			
Edith Hannigan	Forestry and Fire Protection, Land Use Planning	Executive Officer, Board of Forestry and Fire Protection	n/a
Aaron Rachels	Geology, Engineering, Forest Activities, and Storm Water Management	Central Valley Regional Water Quality Control Board	n/a
Stacy Stanish RPF #3000	Biology and Fisheries	CAL FIRE	n/a
Dave Fowler	Geology and Water Quality	North Coast Regional Water Quality Control Board	n/a
Kristina Wolf, Ph.D. CRM #122	Rangeland and Restoration Ecology	Environmental Scientist, Board of Forestry and Fire Protection	n/a

Key: CAL FIRE = California Department of Forestry & Fire Protection; CRM = Certified Rangeland Manager; RPF = Registered Professional Forester; USDA = United States Department of Agriculture.

III. EMC SUPPORTED MONITORING PROJECTS – 2015 to 2024

A comprehensive list of all EMC-supported monitoring projects and links to supporting materials—including completed and closed projects—can be found on the Board's EMC webpage[4] near the bottom of the webpage. For a list of currently active projects, see **Table 2**, next page.

[4] https://bof.fire.ca.gov/board-committees/effectiveness-monitoring-committee/

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EMC Project # Agreement # *Award Amount*	**Title**	**Primary Investigator(s), *Affiliation(s)***	**Project Liaison(s)**	**Project Status**	**Budget Remaining as of 12/31/2024**
EMC-2015-001 8CA03650 *$ 221,271*	Class II Large Watercourse Study: Multiscale investigation of perennial flow and thermal influence of headwater streams into fish bearing systems	• Dr. Kevin Bladon, *Oregon State University* • Dr. Catalina Segura, *Oregon State University*	Drew Coe	• Project Complete and Closed • Final project deliverables received • Anadromous Salmonid Protection Rule change resulted in 2022 • Additional refereed publications anticipated	• Fully allocated • Project Complete
EMC-2016-002 NA*	Post-fire Effectiveness of the Forest Practice Rules in Protecting Water Quality on Boggs Mountain Demonstration State Forest	• Joe Wagenbrenner, *Michigan Technological University* • Kevin Bladon, *Oregon State University* • Drew Coe, *CAL FIRE* • Don Lindsay, *California Geological Survey*	None†	• Project Complete and Closed • Final project deliverables received • Additional refereed publications anticipated	• Fully allocated via other funding streams outside of the EMC* • Project Complete
EMC-2016-003 8CA03680 *$ 100,000*	Road Rules Effectiveness at Reducing Mass Wasting (Repeat LiDAR Surveys to Detect Landslides)	• Bill Short, *California Geological Survey*	• Dr. Matthew O'Connor	• In progress and deliverables up-to-date • Final project deliverables and CRA anticipated 2025	Fully allocated

EMC Project # **Agreement #** ***Award Amount***	**Title**	**Primary Investigator(s),** ***Affiliation(s)***	**Project Liaison(s)**	**Project Status**	**Budget Remaining as of 12/31/2024**
EMC-2017-001 8CA03686 *$ 192,251*	Effects of Forest Stand Density Reduction on Nutrient Cycling and Nutrient Transport at the Caspar Creek Experimental Watershed	• Dr. Helen Dahlke, *University of California, Davis* • Dr. Randy Dahlgren, *University of California, Davis*	• Drew Coe • Lance Leigh	• Final project report and presentation received • Peer-reviewed publication(s) and CRA anticipated 2025 and beyond	Fully allocated
EMC-2017-002 NA *$ 1,200*	Boggs Mountain Demonstration State Forest (BMDSF) Post-Fire Automated Bird Recorders Study	Stacy Stanish, *CAL FIRE*	Dr. Kristina Wolf	• In progress • Final project deliverables and CRA anticipated 2025 and 2026	Fully allocated
EMC-2017-006 9CA04020 *$ 114,844*	Fuel Treatment Alternatives in Riparian Zones of the Sierra Nevada	Dr. Rob York, *University of California, Berkeley*	• Dr. Matthew O'Connor • Drew Coe • Matthew Nannizzi	• Final project presentation received • Peer-reviewed publication and CRA anticipated 2025	Fully allocated
EMC-2017-007 9CA04019 *$ 71,278*	The Life Cycle of Dead Trees and Implications for Management	Dr. John Battles, *University of California, Berkeley*	• Dr. Michael Jones • Dr. Matthew O'Connor • Dr. Leander Love-Anderegg	• Final project presentation and report received • CRA anticipated 2025	Fully allocated
EMC-2017-008 9CA04087 *$ 108,986*	Do Forest Practice Rules Minimize Fir Mortality from Root Disease and Bark Beetle Interactions	Dr. Richard Cobb, *California Polytechnic State University*	• Ben Waitman • Marjan Ghotbizadeh	• Work completed and final project deliverables received • Three peer-reviewed publications anticipated 2025	Fully allocated

EMC Project # **Agreement #** ***Award Amount***	**Title**	**Primary Investigator(s),** ***Affiliation(s)***	**Project Liaison(s)**	**Project Status**	**Budget Remaining as of 12/31/2024**
EMC-2017-012 NA*	Assessment of Night-Flying Forest Pest Predator Communities on Demonstration State Forests – with Monitoring across Seral Stages and Silvicultural Prescriptions	Dr. Michael Baker, *California Department of Forestry & Fire Protection*	Drew Coe	• In progress and deliverables up-to-date • Final project deliverables anticipated 2025 and 2026	Fully allocated via other funding streams outside of the EMC*
EMC-2018-003 9CA04453 *$ 101,802*	Alternative Meadow Restoration	Dr. Christopher Surfleet, *California Polytechnic State University*	• Dr. Leander Love-Anderegg • Dr. Matthew O'Connor	• Final project deliverables received • Presentation to the Management Committee anticipated in early 2025 • Two peer-reviewed publications anticipated in 2025	Funds allocated ($7 reverted)
EMC-2018-006 9CA04452 *$ 694,371*	Effect of Forest Practice Rules on Restoring Canopy Closure, Water Temperature, & Primary Productivity	• Dr. Kevin Bladon, *Oregon State University* • Dr. Catalina Segura, *Oregon State University* • Matt House, *Green Diamond Resource Company* • Drew Coe, *CAL FIRE*	• Ben Waitman • Matthew Nannizzi	• Final report and presentation received • Peer-reviewed publication and CRA anticipated 2025	Fully allocated

EMC Project # **Agreement #** ***Award Amount***	**Title**	**Primary Investigator(s),** ***Affiliation(s)***	**Project Liaison(s)**	**Project Status**	**Budget Remaining as of 12/31/2024**
EMC-2019-002 9CA04801 *$ 68,168*	Evaluating Treatment Longevity and Maintenance Needs for Fuel Reduction Projects Implemented in the Wildland Urban Interface of Plumas County	• Brad Graevs, *Feather River Resource Conservation District* • Jason Moghaddas, *Spatial Informatics Group*	• Dr. Stacy Drury • Drew Coe	• Final project deliverables received • CRA and peer-reviewed publication anticipated in 2025	Fully allocated
EMC-2019-003 9CA04824 *$ 156,665*	Fuel Treatments & Hydrologic Implications in the Sierra Nevada	• Dr. Terri Hogue, *Colorado School of Mines* • Dr. Alicia Kinoshita, *San Diego State University*	• Drew Coe • Givonne Law	• Final project deliverables received • CRA and downloadable user tools anticipated 2025	Funds allocated ($5,795 reverted)
EMC-2019-005 9CA04802 *$ 56,200*	Sediment Monitoring and Fish Habitat – San Vicente Accelerated Wood Recruitment	Cheryl Hayhurst, *California Geological Society*	Bill Short	• Due to wildfire and other extenuating circumstances, contract term expired and remaining funding reverted • Field tour anticipated in 2025 • Project plan revised and results anticipated in 2026 with alternate funding source	Funds allocated ($47,245 reverted)

EMC Project # **Agreement #** ***Award Amount***	**Title**	**Primary Investigator(s),** ***Affiliation(s)***	**Project Liaison(s)**	**Project Status**	**Budget Remaining as of 12/31/2024**
EMC-2021-003 9CA05659 *$ 448,510.00*	Evaluating the Response of Native Pollinators to Fuel-Reduction Treatments in Managed Conifer Forests	Dr. James Rivers, *Oregon State University*	Dr. Michael Jones	• In progress and deliverables up-to-date • Final results, theses, final report and presentation, and CRA anticipated 2025 • Two peer-reviewed publications anticipated 2025 and beyond	$ 133,075
EMC-2022-003 9GA22700 *$ 207,876*	Santa Cruz Mountains Post-Fire Redwood Defect Study	Nadia Hamey, *Hamey Woods*	Jonathan Meurer	• Funding awarded and work in progress • Spring field tour and final deliverables anticipated in 2025	$167,838
EMC-2022-004 9GA22701 *$ 85,000*	A critical evaluation of Forest Practice Regulation's capacity to accommodate forest restoration and resilience targets	Dr. Rob York, *University of California, Berkeley*	Dr. Leander Love-Anderegg	• In progress and deliverables generally up-to-date, with additional file submissions pending from 2022 and 2023 • Final project report, presentation and CRA anticipated 2025	$34,257
EMC-2022-005 9GA22702 *$ 91,278*	Decay Rates and Fire Behavior of Woody Debris in Coastal Redwoods	• Tori Norville, *U.C. Cooperative Extension* • Dr. Michael Jones, *U.C. Cooperative Extension*	Drew Coe	• In progress and deliverables up-to-date • Final deliverables expected 2026	$89,020

EMC Project # **Agreement #** ***Award Amount***	**Title**	**Primary Investigator(s),** ***Affiliation(s)***	**Project Liaison(s)**	**Project Status**	**Budget Remaining as of 12/31/2024**
EMC-2023-002 9GA23701 *$ 94,588*	Assessing Fire Hazard, Risk, and Post Fire Recovery for Watercourse and Lake Protection Zones (WLPZ) and riparian areas of California	• David Saah, *Spatial Informatics Group* • Ryan Tompkins, *U.C. Cooperative Extension*	Jessica Leonard	• In progress and deliverables up-to-date • Project deliverables anticipated 2025	$41,222
EMC-2023-003 9GA23700 *$* 252,492	Pre- and Post-Harvest Fuel Loads and Implications for Site Productivity	Dr. John D. Bailey, *Oregon State University*	Clarence Hostler	• In progress • Data collection and analysis anticipated 2025	$239,439

Key: CAL FIRE = California Department of Forestry & Fire Protection; CRA = Completed Research Assessment.

* EMC-supported, but not EMC-funded

† project liaisons were introduced in late 2020, and the performance period (i.e., funding period) ended prior to assignment of liaisons.

IV. EMC PRIORITIES AND ACCOMPLISHMENTS

2024 EMC Priorities and Accomplishments

Annual priorities are developed by the EMC and the Board as needs arise and with input from the public and stakeholders via an annual call for input. The EMC's progress on its 2024 priorities (see EMC Priorities in the Annual Report, EMC 2024b) was as follows:

1. **Meet at least four times per year in open meetings accessible to the public.**

   The EMC met four times virtually and in person in open, webcast meetings to conduct business. Due to the State's travel freeze, meetings were conducted in a hybrid format to allow as many members to attend as possible without incurring travel costs; members attended from the closest location noticed on the EMC agenda, which is published online at least ten business days prior to the meeting. A quorum was present at all four public meetings.

2. **Meet in the field at least once to observe active or proposed monitoring projects.**

   The EMC did not conduct any field tours in 2024, as a Travel Freeze associated with reductions in the State budget were enacted in 2024.

3. **Support projects related to the EMC Themes and CMQs, including funding new projects where knowledge gaps exist.**

   - The EMC received an allocation of $389,700 from the Timber Regulation and Forest Restoration Fund in FY 2024/25, of which $257,710 was allocated to previously awarded projects (see **Table 2**).
   - For the third year, the EMC utilized a new grant program developed in 2021. Like in 2023, the release of the RFP was shifted earlier in the year to March 2024, rather than summer as in previous years. This has allowed for increased time to review applications, develop project and funding agreements, and encumber funds. This may also allow project PIs to begin work earlier in the FY than has been possible in previous years, as the time limitations of State funding agreements limit the period during which PIs can receive reimbursement for approved research expenses. Over the last two years, grant agreements have been finalized from 3–7 months sooner than contract agreements had previously been developed, and Board and grant department staff continue to refine methods to improve efficiency in developing grant agreements.
   - Over the three fiscal years (starting in 2024/25) under consideration for funding in the 2024/25 RFP (EMC 2024c), and after consideration of previously allocated funds of $307,550 over that same period, remaining funding available for newly proposed projects starting in 2024/25 totaled $932,150, comprising $131,660 in FY 2024/25; $375,160 in FY 2025/26; and $425,000 in FY 2026/27 (assuming allocations in FY 2025/26 and beyond remain at $425,000).
   - The EMC reviewed seven Initial Concept Proposals (ICPs) at the EMC's open, public June meeting and requested Full Project Proposals (FPPs) from all four research teams; ICPs, FPPs, project rankings and notes, and meeting notes may be found on the **EMC's webpage**[5] in the dropdown for the corresponding month below the Meeting Materials heading. Upon review and discussion at the August public meeting, the committee voted to recommend funding for two proposals, EMC-2024-

[5] https://bof.fire.ca.gov/board-committees/effectiveness-monitoring-committee/

001 and EMC-2024-004, with a request to the PIs to reduce their budgets in Year One to accommodate the State's reduced research funding allocation to the EMC. The Board approved the recommended funding at its September meeting. The funded projects proposed research to test the following CMQs (bold questions were prioritized in the 2024/25 RFP [EMC 2024c]):

- EMC-2024-001: Balancing fuel considerations and rare carnivore habitat: an evaluation of risk and reward (Option 1):[6]
  - Theme 6 Wildfire Hazard – Are the FPRs and associated regulations effective in (a) treating post-harvest slash and slash piles to modify fire behavior?; (b) treating post-harvest slash and retaining wildlife habitat structures, including snags and large woody debris?; **(c) managing fuel loads, vegetation patterns, and fuel breaks for fire hazard reduction?**; and **(d) managing forest structure and stocking standards to promote wildfire resilience?**;
  - Theme 9 Wildlife Habitat: Cumulative Impacts – Are the FPRs and associated regulations effective in (a) protecting wildlife habitat and associated ecological processes?; and (b) avoiding significant adverse impacts to wildlife species?; and,
  - Theme 10 Wildlife Habitat: Structures - Are the FPRs and associated regulations effective in retaining (a) a mix of stages of snag development that maintain properly functioning levels of wildlife habitat?
- EMC-2024-004: Establishing a Survey Protocol for Marbled Murrelet Using Passive Acoustic Technology (Phase 1):[7]
  - Theme 7 Wildlife Habitat: Species and Nest Sites - Are the FPRs and associated regulations effective in protection of nest sites (a) following general protection measures in 14 California Code of Regulations (CCR) § 919.2 [939.2, 959.2](b)?; and (b) following species specific habitat and disturbance measures in 14 CCR § 919.3 [939.3, 959.3]?; and,
  - Theme 9 Wildlife Habitat: Cumulative Impacts – Are the FPRs and associated regulations effective in (a) protecting wildlife habitat and associated ecological processes?; (b) avoiding significant adverse impacts to wildlife species?; and (c) protecting rare, threatened, or endangered plants?
    - Note that Question 9c had not been explicitly investigated in any EMC supported research projects prior to 2024, so this is the first project proposing to address this CMQ (see the EMC Research Projects, Research Themes, and Critical Monitoring Questions Matrix [EMC 2024e]).

Board staff began working with the project PIs to obtain required documentation to develop grant agreements on through the grants program in September 2024. The grant agreement for EMC-2024-004 was signed and finalized on December 23, while additional budget details were still being configured for project EMC-2024-001 at the end of 2024. Project PIs may begin work on their projects as soon as grant agreements are signed.

[6] https://bof.fire.ca.gov/media/uvof51er/11g-emc-2024-001-moriarty-full-proposal_redacted.pdf
[7] https://bof.fire.ca.gov/media/1jtnfkky/11i-emc-2024-004-dotters-full-proposal_redacted.pdf

4. Monitor progress on EMC-funded or EMC-supported monitoring projects and share relevant publications.

- The EMC continued to utilize a new framework for processing completed EMC-funded projects—established and utilized for the first time in 2021—to better facilitate EMC reporting to the Board. This "Completed Research Assessment" (CRA; previously known as "Science to Policy Framework") (EMC 2021) provides a step-by-step approach to guide EMC members in verifying scientific integrity and validity of the research, and interprets the results of the scientific research as to the implications for management and policy. Two EMC members volunteer to work with the PIs of each project to complete this document, which is then presented to the EMC and amended as necessary prior to presentation to the Board. This provides an easily understood narrative and synthesis for Board members to give context to study results and inform policy changes, if justified.

- Additional staff support was secured in 2023 via the Water Boards to assist with tracking EMC projects, taking notes during EMC meetings, and coordinating with Project Liaisons and PIs. In general, Water Boards staff have taken the notes during EMC meetings when they are able to attend and contribute to interactions with project PIs to ensure deliverables are received in a timely manner.

- **Project deliverables** were submitted to the EMC in 2024 for the following projects (in addition to regular progress reports at EMC meetings):

  - EMC-2016-002: Post-fire Effectiveness of the Forest Practice Rules in Protecting Water Quality on Boggs Mountain Demonstration State Forest – a previously unsubmitted peer-reviewed article, "Compaction and cover effects on runoff and erosion in post-fire salvage logged areas in the Valley Fire, California**"** was published in the journal *Wildfire and Hydrological Processes* (**Prats et al. 2020**) and submitted to the EMC in 2024.

  - EMC-2017-006: Fuel Treatment Alternatives in Riparian Zones of the Sierra Nevada – several tours and presentations were reported in 2024:
    - Previously unreported presentation to the Forest Practice Committee (a Board standing committee) in March 2023
    - Field tours were conducted with:
      - Lake Tahoe Community College in February 2024
      - Fire Forward in April 2024
      - Future Fire Resource Professionals in April 2024
      - Watershed Education Foundation in July 2023 and July 2024
      - Media outlet British Broadcasting Corporation (BBC) in May 2024
      - Forestry Institute for Teachers in June 2024
    - In May 2024, a presentation was provided to the Forest Landowners of California in (**York 2024a**; also associated with EMC-2022-004)

  - EMC-2017-007: The Life Cycle of Dead Trees and Implications for Management – a final project report, "The Life Cycle of Standing Dead Trees: Implications for Forest Management in the Sierra Nevada" was submitted in 2023 and approved in 2024 (**Battles 2023**)

  - EMC-2017-008: Forest Practice Rules to Minimize Fir Mortality from Root Diseases – a Western International Forest Disease Work Conference presentation given in June 2023 (**Cobb 2023**) was submitted in 2024

  - EMC-2018-003: Alternative Meadow Restoration – several deliverables were received in 2024:

- Draft Completed Research Assessment (**O'Connor and Love-Anderegg 2024a**)
- Final Completed Research Assessment (**O'Connor and Love-Anderegg 2024b**)
- Master of Science in Environmental Sciences and Management thesis (**Ramirez 2024**)
- Peer-reviewed publication, "Estimating and Modeling *Pinus contorta* Transpiration in a Montane Meadow Using Sap-Flow Measurements", was published in the journal *Forests* (**Marks et al. 2024**)

- EMC-2018-006: Effect of FPRS on Restoring Canopy Closure, Water Temperature, & Primary Productivity – a final project presentation (**Bladon et al. 2024**)

- EMC-2019-003: Fuel Treatments and Hydrologic Implications in the Sierra Nevada – two a peer-reviewed publications were submitted in 2024:
  - "A multi-scale assessment of forest treatment impacts on evapotranspiration and water yield in the Sierra Nevada" in the journal *Ecohydrology* (**Boden et al. 2023**)
  - "Water yield response to forest treatment patterns in a Sierra Nevada watershed" in the *Journal of Hydrology* (**Smith et al. 2024**)

- EMC-2021-003: Evaluating the Response of Native Pollinators to Fuel-Reduction Treatments in Managed Conifer Forests – eight items were submitted in 2024:
  - "Comparing passive trapping methods for sampling forest pollinators", a presentation at the FORTE Academic Onboarding for New-to-OSU Students, Oregon State University, Corvallis in September (**Anderson et al. 2024**)
  - "Evaluating native bee community response to fuel reduction treatments in managed timber forests", a presentation given at the Oregon State University Environmental Club in March (**Sampognaro et al. 2024a**), the Western Forest Graduate Research Symposium in April (**Sampognaro et al. 2024b**), the Lassen Field Station Research Symposium in June (**Sampognaro et al. 2024c**), the Oregon State University Spring Poster Symposium (**Gutierrez and Sampognaro 2024**), and to a forestry group at Collins Timber (**Rivers 2024a**)
  - A field tour was conducted for CAL FIRE in July 2024 (**Rivers and Sampognaro 2024**)
  - A project status presentation was given to the EMC in November 2024 (**Rivers 2024b**)
  - Invited Talk (**Rivers 2024a**)
  - Rivers and Sampognaro CalFire Bee Project Handout (**Rivers and Sampognaro 2024**)

- EMC-2022-003: Santa Cruz Mountains Post-Fire Redwood Defect Study – a progress report presentation was provided to the EMC in November 2024 (**Hamey 2024**)

- EMC-2022-004: Assessing Fire Hazard, Risk, and Post Fire Recovery for Watercourse and Lake Protection Zones (WLPZ) and riparian areas of California – several deliverables were received in 2024, including previously unsubmitted items from 2022 and 2023, and Board staff seek to obtain additional deliverables from other presentations or products reported as completed in 2024 and those unsubmitted items from previous years:
  - Presentations were provided to:
    - Forestry Forum in March 2022; the presentation file was shared with the EMC in 2024 (**York 2022**)
    - Marin Wildfire Authority in June 2023 (**Collins 2023**)
    - California Licensed Forester's Association (CLFA) conference in March 2023 (**Tompkins 2023**)
    - Forest Landowners of California in May 2024 (**York 2024a**)
    - Forest Landowners of California (**York 2024a**; also associated with EMC-2017-006)

- Master of Forestry student Connie Ryan gave a presentation in May 2024 as part of the Master of Forestry finishing series
- Written products included:
  - A paper entitled "Operational resilience in western US frequent-fire forests" (**North et al. 2022**) was published in *Forest Ecology and Management* and shared with the EMC in 2024
  - A research brief, "Evaluating the Development and Application of Stand Density Index for the Management of Complex and Adaptive Forests" was published in February 2024 in *Current Forestry Reports* (**Chivhenge et al. 2024**)
  - Progress report in June 2024 (**York 2024b**)

- EMC-2022-005: Decay Rates and Fire Behavior of Woody Debris in Coastal Redwoods – two products were received in 2024:
  - Annual Progress Report (**Norville 2024**)
  - Progress Report Presentation (**Norville and Jones 2024**)
- EMC-2023-002: Assessing Fire Hazard, Risk, and Post Fire Recovery for Watercourse and Lake Protection Zones (WLPZ) and Riparian Areas of California – four items were received for 2024:
  - A progress report presentation was provided to the EMC in November 2024 (**Miley 2024**)
  - A project summary detailed the work conducted in 2024 (**Saah and Moghaddas 2025**)
  - Project map: **Calfire EMC Riparian Fire**[8]
  - Draft statewide WLPZ burn analysis dashboard (see **PC537 Hydro Lines vs Fires**[9])

- To facilitate dissemination of EMC-relevant research, the EMC coordinates with CAL FIRE to post and share selected publications and information relevant to the EMC's efforts.
  - The EMC shared the "Forest Practice Rules Implementation and Effectiveness Monitoring (FORPRIEM) Program 2008-2013 Monitoring Results" (**Brandow and Cafferata 2014**). This report was previously removed from hosting on CAL FIRE's website due to a lack of ADA compliance, but Board staff converted the document to compliant, and the EMC is now hosting this paper on its website. The California Forest Practice Act and Rules (Title 14, California Code of Regulations) are designed in large part to protect water quality and aquatic habitat in non-federal forested watersheds during and after silvicultural activities. The critical questions are (1) what are the rates of proper implementation of the water quality-related Forest Practice Rules (FPRs)?; and, (2) when properly implemented, how effective are they in protecting water quality?. Forest Practice Rules Implementation and Effectiveness Monitoring (FORPRIEM) addressed these two questions using forensic monitoring data collected on a random sample of harvesting plans and sites within those plans. Overall, the study found that the rate of compliance with FPRs designed to protect water quality and aquatic habitat is generally high, and that they are effective in preventing erosion, sedimentation, and sediment transport to channels when properly implemented.
  - Member Coe noted that the Board approved the Forest Fire Prevention Monitoring Report at the January meeting; the draft has now moved to agency for further review (**Olsen et al. 2023**).

[8] https://gsal.sig-gis.com/portal/apps/experiencebuilder/experience/?id=16d2e70373fa40a2b007b42b48147b37&page=Plumas-County
[9] https://gsal.sig-gis.com/portal/apps/dashboards/75b9d9d44911440c871c61ba011cbab6

This extensive report looks at outcomes following implementation of forest fire prevention exemptions, and recommendations do call for the potential need for statutory change.

5. Review and update EMC Research Themes and CMQs as needed.

- One new CMQ was added to Research Theme 9, Wildlife Habitat - Cumulative Impacts, along with few minor, non-substantive changes made for clarification (see all revisions in the DRAFT Research Themes and CMQs 2024, EMC 2024h).
- The Research Themes and CMQs were revised by the EMC and approved in January 2024 for the 2024/25 RFP (EMC 2024c). The final version of the Research Themes and CMQs for 2024 were approved by the Board in March, posted on the EMC and Board webpages, and disseminated to various listservs (EMC 2024g).

6. Identify up to five themes/CMQs for priority research funding in the 2024/25 RFP.

Four CMQs were prioritized for funding in the 2024/25, but not to the exclusion of projects focusing on the remaining CMQs or other research needs related to the FPRs and associated regulations (see the 2024/25 RFP, EMC 2024c).

7. Use an Adaptive Management approach to provide research results that inform management and policy development.

Findings from EMC-2018-003 were presented to the EMC in a draft CRA (**O'Connor and Love-Anderegg 2024a**). After EMC input, the CRA was revised and approved by the EMC at a subsequent meeting for transmission to the Board. The Board approved the final version on December 11, 2025 (**O'Connor and Love-Anderegg 2024b**) Results from this research will be presented to the Management Committee in early 2025.

8. Revisit the EMC's Charter to assess need for changes, and begin process of revision, if needed.

The EMC proposed revisions to the Charter, which was updated and approved by the Board at its November meeting (EMC 2024a). The updated Charter highlights the priorities of the EMC and the primary changes are as follows:

- Added a Values section to highlight the EMC's focus on adaptive management, sustainable solutions, and public transparency.
- Clarified the EMC's priority to develop and disseminate information (e.g., literature reviews, internal analyses, publications, grey/white literature) relevant to the Forest Practice Rules and related regulations.

The revised Charter reflects the current needs and priorities of the EMC, the Board, stakeholders, and the public.

9. Fill currently open and pending open EMC seats, as well as any seats for which terms expire in 2023, filling gaps in expertise and agency representation as needed.

Three new members were welcomed to the EMC in 2024, and three members were reappointed. The updated Membership Roster is available online at EMC Members and Term Expirations (EMC 2024d). See **Section II. EMC MEMBERSHIP AND STAFF** for further details.

2025 EMC Priorities

In 2025, the EMC priorities are as follows:

1. **Meet at least four times per year in open meetings accessible to the public.**
2. **Meet in the field at least once to observe active or proposed monitoring projects.**
3. **Support projects related to the EMC Themes and CMQs, including funding new projects where knowledge gaps exist.**
4. **Monitor progress on EMC-funded or EMC-supported monitoring projects.**
5. **Review and update EMC Research Themes and CMQs as needed.**
6. **Identify themes/CMQs for priority research funding in the 2025/26 RFP.**
7. **Use an Adaptive Management approach to provide research results that inform management and policy development.**
8. **Review EMC Guidance Documents and revise as needed, including the Strategic Plan.**

   Update the EMC's Strategic Plan, which is to be updated on a bi-annual cycle (last updated in 2022) and other guiding and reporting documents as needed (e.g., Project Liaison Guide, Completed Research Assessment).

9. **Fill currently open and pending open EMC seats, as well as any seats for which terms expire in 2024, filling gaps in expertise and agency representation as needed.**

   Member Dr. Forsburg-Pardi's term expires in January 2025, and if she will not be continuing with the EMC, Board staff will consult with the Board as to an appropriate replacement. Board staff will continue to encourage EMC members and partnering agencies to fill one open seat on the Monitoring Community and one agency representative for the USFWS, and to find an appropriate candidate to backfill an agency representative for the USFS. See Section II. EMC MEMBERSHIP AND STAFF for more details.

V. EMC PROJECT UPDATES AND PRODUCTS

The following project summaries provide more information on reported activities in 2024 (or prior years, if previously unreported), including details on project deliverables provided in 2024 or that are anticipated in future years.

EMC-2015-001 (8CA03650): Class II Large Watercourse Study: Multiscale investigation of perennial flow and thermal influence of headwater streams into fish bearing systems

This project investigated the variability of relationships between drainage area, active channel width, and perennial flow extent across the Anadromous Salmonid Protection (ASP) area (broad-scale study on flow permanence and network connectivity); compared these relationships to the rule criteria for Class II-L identification in terms of both drainage area and average active channel width (i.e., 14 CCR §916.9 [936.9, 956.9] (g)(1)(a)(1 and 2)); determined if those criteria were effective in identifying perennial Class II-L watercourses in different lithologies, or if rule modifications are needed (broad-scale study on flow permanence and network connectivity); and conducted a pilot study to investigate the downstream propagation of water temperature from Class II-L systems in sites with contrasting lithology (longitudinal stream temperature study).

A final project report and presentation to the EMC, Board, and Forest Practice Committee, as well as a final CRA were provided in 2021, and a presentation was provided at a California Fire Science seminar. Two peer-reviewed publications were developed out of this research and accepted in 2021 and 2022. A rule revision related to the ASP Rules resulted from this research in 2022, such that the rule language was simplified for identification of Class II Large (II-L) watercourses (i.e., 14 CCR § 916.9 [936.9, 956.9] (g)(1)(A)(2) was removed, as was the sunset language in 14 CCR § 916.9 [936.9, 956.9] (g)(1)(C)] which mandated an assessment of the effectiveness of the various Class II-L identification methods). No additional products are anticipated, and the project is complete and closed.

EMC-2016-002: Post-fire Effectiveness of the Forest Practice Rules in Protecting Water Quality on Boggs Mountain Demonstration State Forest

This study measured the effects of post-fire salvage logging and post-salvage site preparation techniques on runoff, erosion, carbon flux rates, and vegetative recovery on the Boggs Mountain Demonstration State Forest (BMDSF), which burned in the 2015 Valley Fire. This project also planned to develop and demonstrate alternative Best Management Practices (BMPs) for post-fire operations. The results may have implications for the FPRs (14 CCR § 913 (933, 953), 14 CCR § 914.2 [934.2, 954.2](a), 14 CCR § 915[935, 955]). This research was funded from sources outside the EMC, but was otherwise supported by the EMC.

Two Masters of Science theses were developed out of this research in 2016 and 2020; two peer-reviewed publications were accepted in 2019 and 2020; a poster was presented at the American Geophysical Union 2020 fall meeting; and a presentation was provided at a CA Fire Science seminar in 2021. To date, three peer-reviewed manuscripts have been accepted centered around hillslope plot scale erosional response to various salvage logging treatments, a series of field and lab-based rainfall simulation studies that isolate the causal mechanisms for post-fire, and post-salvage erosional response (previously submitted publications were received in accepted in 2019 and 2020; one additional article was previously published and received in 2024: **Prats et al. 2020**). In 2023, a guidance document was published as California Forestry Report #7: Mitigating potential sediment delivery from post-fire salvage logging. The project is completed, but at least three additional manuscripts will be submitted: 1) catchment scale runoff and sediment delivery across a range of soil burn severities; 2) long term recovery of salvage logged hillslope plots across a range of management treatments; and 3) runoff simulations detailing the effectiveness of skid trail BMPs on sediment delivery.

EMC-2016-003 (8CA03680): Road Rules Effectiveness at Reducing Mass Wasting (Repeat LiDAR Surveys to Detect Landslides)

This project compares two LiDAR acquisitions that bracket stressing event(s) (i.e., storm events that trigger mass wasting events) to determine the activity and characteristics of mass wasting features (e.g., unstable areas and unstable soils). This study was designed to test the effectiveness of repeat surveys in assessing landslide movement in harvested and unharvested forests as a proof-of-concept that repeated surveys could be used following large storm events rather than requiring on-the-ground assessments and aerial photographs. The research relates to the FPRs and related regulations (14 CCR § 916 [936, 956]), (14 CCR § 916.9 [936.9, 956.9](v)), 14 CCR § 913 [933, 953]), (14 CCR § 914 [934, 954]), (14 CCR § 923 [943, 953]), (14 CCR § 923 [943, 953]), s (14 CCR § 923 [943, 953]), [14 CCR § 916 (936, 956), 14 CCR § 916.4 (936.4, 956.4) (b)].

A project status update and presentation at the Geological Society of America meeting occurred in 2022. Member Short reported at the July 2024 EMC meeting that the final analysis and report were pending

completion and expected at the end of 2024; however, illness prevented completion of these products. Thus, the final project report, presentation, and CRA are expected in 2025.

EMC-2017-001 (8CA03685): Effects of Forest Stand Density Reduction on Nutrient Cycling and Nutrient Transport at the Caspar Creek Experimental Watershed

This research examined how forest harvesting affects ecohydrological and biogeochemical processes and nutrient cycling within the South Fork of Caspar Creek. This work complements several other sub-studies in the South Fork. The response of biogeochemical processes to disturbance may also provide useful information when evaluating the impacts of emerging land uses. This project relates to the FPRs and regulations (14 CCR §§ 916.9 (936.9, 956.9)(a)(7)(b); Technical Rule Addendum #2).

A detailed study plan and report on sampling methods were provided in 2017, and two progress reports were submitted in 2018. A comprehensive final project report and presentation were received in 2021 and 2022, respectively, but these deliverables do not represent the full suite of products that are likely to come out of these experiments. Additional analyses are needed before a CRA can be produced on this project. Additional publications are expected, although these will likely take at least an additional year to produce. Lance Leigh of the North Coast Regional Water Quality Control Board was assigned to work with Member Coe on drafting the CRA for this project.

EMC-2017-002: Boggs Mountain Demonstration State Forest (BMDSF) Post-Fire Automated Bird Recorders Study

This study examines how fire and salvage harvesting affect bird presence and diversity in the post-fire setting of BMDSF. The objectives of this study include establishing the baseline presence and diversity of bird species in a post-fire setting, comparing the occupancy of different habitats by bird species, and comparing occupancy results to the larger statewide data being collected by the Department of Fish & Wildlife (CDFW). This work is associated with 14 CCR § 1052. This research was funded from sources outside the EMC but was otherwise supported by the EMC.

A progress report presentation and tour of the study site were given in 2023. At the July 2025 EMC meeting, Member Coe reported that PI Stacy Stanish was working to leverage habitat data but was waiting on the Fire and Resource Assessment Program (FRAP) to complete its assessment and the timeline is still to be determined. Other presentations and/or posters have been made at conferences or other events in prior years, but the EMC does not have copies of all deliverables for this project, although Board staff continue to work on obtaining those documents. A final project presentation, report, and CRA are expected in 2025 or 2026.

EMC-2017-006 (9CA04020): Fuel Treatment Alternatives in Riparian Zones of the Sierra Nevada

This research aims to better understand the ecological role that fire plays in sustaining Sierra Nevada Forest structure and composition, including interactions of forest management and fire behavior on private lands (14 CCR 937.2, 957.2 and 14 CCR 1038(c)). The objective of this project was to establish a network of locations that will be maintained as long-term study sites, periodically providing information relevant to policy and management for decades.

A presentation to the CLFA was given in 2019, and a white paper on partial harvest in WLPZs was also developed. An EMC field tour was conducted in August 2020, and a blog post for UCANR was developed for Forest and Research Outreach in 2021. A variety of deliverables were completed in 2023, including a final

project presentation provided to the EMC and a field tour hosted for the EMC. A variety of tours and presentations at other venues were reported to the EMC in 2024, although the EMC has not received files for these events, and will continue to seek associated deliverables: a presentation was given to the Forest Practice Committee (a Board standing committee) in March 2023; field tours were conducted with the Lake Tahoe Community College in February 2024, Fire Forward in April 2024, Future Fire Resource Professionals in April 2024, the Watershed Education Foundation in July 2023 (and in July 2024 as well), media outlet British Broadcasting Corporation (BBC) in May 2024, and Forestry Institute for Teachers in June 2024. In May 2024, a presentation was provided to the Forest Landowners of California in (**York 2024a**); this presentation is also associated with EMC-2022-004. A final project report is not expected on this project; Members Nannizzi and Dr. O'Connor will develop a CRA in 2025. A peer-reviewed publication is also anticipated on this project.

EMC-2017-007 (9CA04019): The Life Cycle of Dead Trees and Implications for Management

The goal of this project was to quantify the life cycle of standing dead trees (snags) to inform forest management and policy development. This study is associated with 14 CCR § 1038(k)(5), [916.4, 936.4, 956.4 Watercourse and Lake Protection (b).g.6], and s [14 CCR § 919.1 (939.1, 959.1)]. The objectives of this project include:

1. Extend the record in Compartment 160 to 2018 by repeating the snag inventory and evaluation.
2. Establish a new monitoring protocol that tracks cohorts of new snags on an annual basis to quantify development of cavities and other important habitat elements.
3. Establish a long-term study of downed woody decay rates.

The final project presentation and report was received in 2023 and approved for publication in 2024 (**Battles 2023**). All project deliverables have been received, and Members Dr. Jones and Dr. Anderegg will develop a CRA in 2025.

EMC-2017-008 (9CA04087): Do Forest Practice Rules Minimize Fir Mortality from Root Disease and Bark Beetle Interactions

This project sought to evaluate several sections of the FPRs for their effectiveness in controlling fuels accumulation in the face of devastating bark beetle outbreaks in true fir stands. The combined results might be used in an evaluation 14 CCR § 1038 (b). The study may also provide insight into application of 14 CCR § 917.9/937.9/957.9(b) and 14 CCR § 913.3/933.3/953.3(b)), to evaluate the need for rule modifications in light of treatment efficacy and the magnitude of the current bark beetle outbreak. Two peer-reviewed publications were produced from this research in 2021 and 2023; a final presentation was provided to the EMC and a CRA was finalized in 2022; and a poster was presented at the Western International Forest Disease Work Conference in 2023 and submitted to the EMC in 2024 (**Cobb 2023**). While the EMC ultimately determined that the results of this research did not directly address specific targets or prescriptions in the FPRs, this work addressed an important disease affecting commercial timber species and identified important practices that can aid the timber industry in maintaining susceptible stands. All project deliverables have been received, and three additional peer-reviewed publications are anticipated in 2025.

EMC-2017-012: Assessment of Night-Flying Forest Pest Predator Communities on Demonstration State Forests – with Monitoring across Seral Stages and Silvicultural Prescriptions

This study explores bat communities in 50+ year old forest stands and asks, "Are the FPRs effective in promoting habitats suitable for bat survival?" which is related to the following regulations: 14 CCR § 897, 14 CCR § 912.9 (932.9, 952.9), 14 CCR § 913.4 (939.4, 959.4), and 14 CCR § 919 (939, 959). The research relates to EMC Research Theme 7 (Wildlife Habitat: Species and Nest Sites), Theme 8 (Wildlife Habitat: Seral Stages), and Theme 10 (Wildlife Habitat: Structures). This research was funded from sources outside the EMC but was otherwise supported by the EMC.

Sampling for this project has occurred at Jackson Demonstration State Forest (DSF), Mountain Home DSF, Soquel DSF, and Latour DSF in the summers of 2019, 2022, 2023, and 2024, respectively.

Several deliverables have been provided over the years: a progress report to the EMC in 2022; a poster at the Northeastern Bat Working Group in 2022; a poster at the North American Symposium on Bat Research in 2023; a peer-reviewed publication in 2023; and a dataset in 2023. The final project report and presentation to the EMC will provide analyses of bat species' presence relative to silvicultural history and local/landscape level habitat measurements with discussion of aggregate results from all four DSFs. Individual reports and presentations detailing each of the JDSF and MHDSF field seasons will be completed in 2025, with reports and presentations detailing each of the SDSF and LDSF field seasons to be completed in 2026. Members Waitman and Nannizzi will develop the CRA once the final presentation and report have been provided to the EMC.

EMC-2018-003 (9CA04453): Alternative Meadow Restoration

This study evaluates the application of CCR § 933.4[e] for removal of encroached conifer trees in a northern Sierra meadow. A final project report and presentation were received for this project in 2023. A Master of Science in Environmental Sciences and Management thesis was produced for Rock Creek Meadow and included one additional year of data collection beyond the EMC-funded project (**Ramirez 2024**). Final findings for this research were presented to the EMC in a draft CRA (**O'Connor and Love-Anderegg 2024a**) at the November 2024 EMC meeting. After EMC input, the CRA was revised and approved by the EMC at a subsequent meeting for transmission to the Board (**O'Connor and Love-Anderegg 2024b**); the Board approved the final version on December 11, 2024. A peer-reviewed publication, "Estimating and Modeling *Pinus contorta* Transpiration in a Montane Meadow Using Sap-Flow Measurements", was published in the journal *Forests* (**Marks et al. 2024**). Results from this research will be presented to the Management Committee in 2025, although it is not anticipated that any rule change(s) would be proposed. Additional publications expected include a peer-reviewed journal article on the 10 years of data collected at all the research meadows for the journal *Forest Ecology and Management*, and an article on the vegetation response of Rock Creek Meadow following lodgepole pine removal will be submitted to the journal *Restoration Ecology*.

EMC-2018-006 (9CA04452): Effect of Forest Practice Rules on Restoring Canopy Closure, Water Temperature, & Primary Productivity

This project seeks to tackle key factors regarding the effectiveness of protecting key quality elements in the WLPZ, and in particular, aims to answer how current ASP FPRs and pre-ASP requirements for Class II watercourses influence canopy closure, solar radiation, stream temperature, and streamflow. The PIs investigated the importance of different drivers in influencing variability around stream temperature dynamics and primary productivity across different Class II riparian prescriptions.

A variety of deliverables have been produced from this research: a progress report presentation was given to the EMC in 2021; three theses were developed, including one in 2021 and two in 2022; two peer-

reviewed articles were published in 2022 and 2023; and a final project report was provided in 2023. Project updates were given at the January and November 2024 EMC meetings. Dr. Kevin Bladon, Associate Professor of Forest Ecohydrology and Watershed Science at Oregon State University, provided a final project presentation, "Effectiveness of Class II Watercourse and Lake Protection Zone (WLPZ) FPRs and Aquatic Habitat Conservation Plan (AHCP) Riparian Prescriptions at Maintaining or Restoring Canopy Closure, Stream Water Temperature, Primary Productivity, and Terrestrial Habitat", to the EMC at the July 2024 EMC meeting (**Bladon et al. 2024**).

Multiple riparian prescriptions (i.e., treatments) were compared in the 100 feet outside watercourses, including 6 reference sites and 4 in each of three different treatments, and monitoring occurred pre- and post-harvest across 18 watersheds from north of McKinleyville, grouped into northern and southern areas. Treatments were classified as follows:

1) **REF** (Reference) – unharvested untreated, 6 reference sites;
2) **ASP** – Current CA rules for Class II watercourses in ASP Zones (e.g., no harvest allowed within 30 inner feet (Inner Core Zone), 80% overstory canopy retention in the next 70 ft (outer portion of the 100 ft riparian buffer);
3) **GRDC AHCP** – Green Diamond customized riparian prescription, which is a modification of the above treatment = GDRC AHCP (85% overstory in inner 30 feet, and 70% in next 70 ft); and,
4) **PRE** (Pre-ASP) – for the old rules prior to the ASP rules being in effect (50% overstory within 100 ft).

Slopes were relatively comparable across the different watersheds, as were vegetation type (i.e., second generation, ready for harvest), slope, and aspect. There was a little more variability in the catchment area harvested and elevation. Precipitation was a factor in this study, as there were some very dry years. All periods (pre, post-harvest Year 1, and post-harvest Year 2) were drier than normal, and some streams even went dry during the study. Substantial intra-annual variability in timing of precipitation was accounted for in the statistical analysis.

Key data were collected in six fixed plots within each 18 of the watershed sites (108 plots, monitored a total of ~ 1800 trees), and data collected included tree species, diameter, basal area, canopy class, mortality agents of decay class, and photos for canopy closure. Pre-harvest data were collected from 2019–2020, and post-harvest data were collected in 2021–2022. For canopy, the researchers utilized hemispherical photography to determine canopy closure and effective shade. To determine stage and discharge, they instrumented pressure transducers at outlets to measure stage of the water (elevation of the water) every 15 min over the course of the study and used salt dilution gauging to develop curves for each stream. Twelve stream temperature sensors were placed longitudinally along the ~1000 feet of each stream, with 4 co-located air temperature sensors, for a total of 288 sensors.

Results were as follows:

- ***Basal Area*** – While the PIs assumed basal area would decrease in the ASP and HCP sites, there was actually a slight increase, although there was no statistical difference across the four different treatments. This could be due to a variety of introduced factors (e.g., users, monitoring groups), but it could also be partially due to inherent variability. The biggest decline was in the Pre-ASP group, which was expected, and the target was reached in terms of basal area reduction.

- ***Overstory*** – in the pre-harvest period sites were very comparable, and in post-harvest, there was little difference in effective shade in the REF and ASP and HCP sites; however, there was a large decline in overstory in the PRE (older prescription) sites.
- ***Stage and Discharge*** – volumetric flow can have impacts on stream temperature, and capturing very high flow events in rating curves is a challenge, so there is less confidence at those data. The PIs built a picture of continuous volumetric flow over the course of the study.
- ***Daily Streamflow*** – the PIs were more confident in summer data when high flow events were not a challenge. However, the summer harvest area was below where the stream was instrumented, so was accounted for in the analyses. Daily streamflow in the summer generally followed precipitation, and post-harvest streamflow was higher, as was expected.
- ***Change in Daily Streamflow*** – statistically there were differences in the PRE, ASP, and the HCP streamflow post-harvest, but it was small (1–1.5 milliliters), and likely to have little impact on water quality and habitats.
- ***Change in Diel Streamflow (max vs. min streamflow)*** – there was a small change in diel streamflow.
- ***Photosynthetic Active Radiation (PAR) and Dissolved Oxygen (DO)*** – there was no statistical difference in the amount of radiation reaching the stream, except for the pre-ASP treatment. While only the pre-ASP doesn't appear to have a substantial change, there was significantly greater radiation reaching the stream compared to the other treatments. There was no significant difference for the DO treatments.
- ***Stream and Air temperature:*** the streams themselves seemed to buffer against additional radiation coming through in some treatments, and in general, the streams were well-buffered from changes in radiation, even in the pre-ASP site.
- ***Chemical Water Quality*** – very little differences in nitrogen and phosphorus related to treatment. Differences in nitrogen were primarily related to the different regions, and to watershed area harvested, catchment slopes, and alder cover.
- ***Primary Productivity*** – no significant differences pre- or post-harvest.

The PIs concluded that:

- The strongest change in riparian canopy characteristics was in pre-ASP sites, but no significant changes occurred in stream temperatures. Stream temperatures did not exceed anything that would indicate potential negative impacts to salmonids in these systems, even in the PRE sites. There was little evidence of downstream warming or cooling, or discrete locations of groundwater discharge.
- Increased streamflow during summer low flows appeared to be related to catchment area harvested.
- There was no evidence for significant impacts to nutrients or primary productivity.
- There was no significant evidence that riparian management prescription was a major driver of seasonal temperature responses.
- Thermal regimes were most strongly related to climatic variability and catchment topography related to regional differences.

Members Dr. Waitman and Nannizzi anticipate developing the CRA for this project in early 2025.

EMC-2019-002 (9CA04801): Evaluating Treatment Longevity and Maintenance Needs for Fuel Reduction Projects Implemented in the Wildland Urban Interface of Plumas County, CA

This study assessed the current maintenance needs for all projects funded, implemented, and or supported by the Plumas Fire Safe Council (FSC) to determine treatment longevity and maintenance needs. The goal of this work was to inform Plumas FSC on its treatment life cycle to ensure better planning for funding future treatment maintenance and substantiate that the FSC has and continues to utilize accurate scientific resources in their treatment design and long-term maintenance strategy. This study is related to 14 CCR § 912.7 [932.7, 952.7]), 14 CCR § 961, 14 CCR § 913 [933, 953], 14 CCR § 917 [937, 957], 14 CCR § 1038, 14 CCR § 1052, and 14 CCR § 1051.

A final project report was provided in 2021, and the final project presentation was provided to the EMC in 2022. An initial CRA was developed in 2024, but this draft will not be completed until 2025, and an additional peer-reviewed publication is expected in 2025.

EMC-2019-003 (9CA04824): Fuel Treatments and Hydrologic Implications in the Sierra Nevada

In the context of the Sagehen experimental watershed in the Sierra Nevada, researchers in this project investigated how and to what spatial extent scale forest treatments impact annual runoff (i.e., water yield) and annual evapotranspiration. Several unexpected setbacks, including the pandemic, resulted in delays with completing the work, and a time extension was processed on April 25, 2022, allowing the PIs up to one additional year (to June 30, 2023) to develop the final deliverables.

A presentation was given at the American Geophysical Union in 2021, and a progress report presentation was provided to the EMC in 2022. Two peer-reviewed publications were submitted to the EMC in 2024: "A multi-scale assessment of forest treatment impacts on evapotranspiration and water yield in the Sierra Nevada" in the journal *EcoHydrology* (**Boden et al. 2023**), and "Water yield response to forest treatment patterns in a Sierra Nevada watershed" in the *Journal of Hydrology* (**Smith et al. 2024**). These publications serve as the final project deliverables, and Members Law and Dr. O'Conner will develop a CRA in 2025. Additional project deliverables expected include a downloadable integrated package including models and statistical framework for use by stakeholders, resource managers and decision-makers.

EMC-2019-005 (9CA04802): Sediment Monitoring and Fish Habitat – San Vicente Accelerated Wood Recruitment

This project was severely impacted at several points by wildfire, the COVID-19 pandemic, and other factors outside of the researchers' control. Two watersheds to be studied in Santa Cruz County burned in the CZU Lightning Complex and the Timber Harvest Plan (THP), a critical component of the research, could no longer be efficiently pursued. It was determined that the project could not be completed within the timeframe allowed by the contract, and approximately $9000 was distributed for equipment, with the remaining funds reverting on June 30, 2022. The California Geological Survey (CGS) planned to continue work going forward with a modified research plan.

Additional work was conducted from 2022 through 2024. Data collected included study reach large wood inventories, cross-section surveys, thalweg profile surveys, pebble counts, and data collection from photo points, time-lapse game cameras, pressure transducers, and a rain gauge. The raw, unprocessed drone LiDAR and photogrammetry data collected in 2022 and received in Spring 2023 are undergoing processing and analysis. Preparations are in progress for the third annual monitoring event scheduled for 2025,

including drone LiDAR data collection, with final results anticipated in 2026. A field tour showcasing results from the revised study is anticipated in 2025.

EMC-2021-003 (9CA05659): Evaluating the Response of Native Pollinators to Fuel-Reduction Treatments in Managed Conifer Forests

This research aims to determine how wild bee communities respond to widespread fuel-reduction treatments in managed forests that are commonly implemented under current FPRs. Encompassing EMC Research Theme 6 (Wildfire Hazard) and Theme 9 (Wildlife Habitat: Cumulative Impacts) together, these themes cover a range of FPRs. This work combines these two themes to quantify and evaluate whether current FPRs and associated regulations for reducing fire risk that that arise from timber harvesting plans (14 California Code of Regulations [CCR] 2 § 1038, 1051.4, 1052.4), special prescriptions (14 CCR§ 913.4 [933.4, 953.4]), and hazard reductions (14 CCR§ 917 (937, 957) are effective in providing suitable protection practices for wildlife (14 CCR§ 919, 939, 959).

Principal Investigator Dr. James Rivers reported that lead graduate student Megan Sampognaro (Master of Science, College of Forestry, Oregon State University) completed the first field season in 2023. With over 10,000 specimens collected, preliminary results indicate more bee diversity in shaded fuel breaks relative to untreated areas. Specimens are currently being processed and identified by project collaborators in Utah. The 2024 field season started in late May and bee phenology appeared to be lagging behind the previous year.

Six posters or presentations were provided in 2024: "Comparing passive trapping methods for sampling forest pollinators" at the FORTE Academic Onboarding for New-to-OSU Students, Oregon State University, Corvallis in September (**Anderson et al. 2024**); "Evaluating native bee community response to fuel reduction treatments in managed timber forests" at the Oregon State University Environmental Club in March (**Sampognaro et al. 2024a**), at the Western Forest Graduate Research Symposium in April (**Sampognaro et al. 2024b**), at the Lassen Field Station Research Symposium in June (**Sampognaro et al. 2024c**), at the Oregon State University Spring Poster Symposium (**Gutierrez and Sampognaro 2024**), and to a forestry group at Collins Timber (**Rivers 2024a**). A field tour was conducted for CAL FIRE in July 2024 (**Rivers and Sampognaro 2024**), and a project status presentation was given to the EMC in November 2024 (**Rivers 2024b**).

The M.S. thesis defense for Megan Sampognaro is scheduled for July 2025, and she will also give a talk at the 2025 Entomological Society of America conference in Portland in November 2025 as part of a forest pollinator research symposium. Preliminary results and project deliverables are expected in 2025, including a master's thesis and data products, submission of two manuscripts, final project report and presentation, and a draft CRA.

EMC-2022-003 (9GA22700): Santa Cruz Mountains Post-Fire Redwood Defect Study

This project investigates how post-fire measurements correlate with the amount of defect in individual coast redwood trees and will seek to understand the relationships between fire damage and bole decay from fire indicators and post-fire effects on live redwood. The study addresses the CMQs for Research Theme 6 (Wildfire Hazard), and may influence the following standards: Minimum stocking standards (14 CCR § 912.7 [932.7, 952.7]); Silvicultural methods and stocking requirements (14 CCR § 913.8); Silvicultural objectives and regeneration methods (14 CCR § 913 [933, 953]); Exemptions which facilitate removal of dead, dying or diseased trees (14 CCR § 1038); and Emergency notices which also facilitate removal of burned, dead, dying or diseased trees (14 CCR § 1052). The study will also address the CMQs for Theme 7

(Wildlife habitat: species and nest sites) by helping land managers make informed decisions on tree selection during a salvage harvest, which affects wildlife habitat; and CMQs for Theme 8 (Wildlife habitat: seral stages), as it will assist foresters in determining tree health and potential longevity, which may allow for more trees to remain, thereby accelerating the return of late seral stage features. Finally, the study will also shed light on the CMQs for Theme 10 (Wildlife habitat: structures), as wildlife habitat is created in redwoods via repeated fires that introduce rot and burn out basal hollows. Therefore, this study has implications for timber production as well as management for overall forest health and wildlife habitat. Member Jonathan Meurer volunteered to act as the project liaison at the January 2024 EMC meeting.

Three written progress reports were provided to the EMC in 2023. A progress report presentation was provided at the November 14, 2024 EMC meeting (**Hamey 2024**). The study occurs in the footprint of the CZU (Santa Cruz-San Mateo Unit) Lightning Complex Fire on the San Vicente Redwoods property and California Polytechnic State University, San Luis Obispo's Swanton Pacific Ranch, including approximately 160 trees in total. About 43% of the property burned with high severity. Field work conducted thus far includes post-fire effects data collection and cambium checks on target trees in both study areas and scaling plus sonic tomography to assess the structural integrity across a cross-section of each tree. Electrical impedance was also used to show the water content across the same cross-section of each tree. Researchers asked the following questions:

- How much decay is present?
- Can we predict the level of defect caused by a fire by looking at post-fire effects of Coast redwood?
- Is sonic tomography and electrical impedance an accurate method to detect decay and water content when compared to the cross section of a Coast redwood?

Preliminary results showed that the majority of logs displayed discoloration of the sapwood. The large end of the first log (16' log lengths) had an average circumference decay of 34%, while average volume reduction was 21%. An inverse relationship was observed between Diameter at Breast Height and percent decay. Merchantable tops increased in size for acceptable material from approximately 6 inches to 9 inches.

Data collection is ongoing on burned redwood trees that will be cut and salvaged in summer 2025. The trees will be scaled in the project area before the merchantable logs are removed from the woods to capture the current condition of wood decay approximately 4.5 years post-fire. Post-fire effects will be analyzed to determine which indicators more accurately predict the introduction of decay in the tree's bole. Future work will include more measurements of post-fire effects and internal decay progression on trees that have not yet been cut.

A conference presentation is anticipated in spring 2025, along with an EMC field tour and at least two additional workshops showcasing the project in early 2025. A final project report and final presentation are expected in Spring 2026. Hamey Woods is working on a field guide that shows visible indicators of burn damage to help land managers make informed decisions on post-fire tree selection and acceptable levels of burn damage.

EMC-2022-004 (9GA22701): A Critical Evaluation of Forest Practice Regulation's Capacity to Accommodate Forest Restoration and Resilience Targets

The FPRs rely heavily on basal areas as the primary metric for retention requirements during any selection or thinning harvest (e.g., Title 14 CCR 913.2(a)(2)(A); CCR 913.3(a)(1)(A)). However, historic basal areas are often far below those currently recommended in the FPR's (Collins et al. 2015), which intend to maintain

high levels of growth and yield for timber production (Title 14 CCR 913.11), and recent studies (Goodwin et al. 2020; Bernal et al. 2022) have suggested that stocking targets may still be too high given climatic stress.

This project investigates how current FPRs can facilitate or preclude meeting condition targets for forest restoration and resilience by compiling the range of historical forest stocking measures from the best available research for these ecosystems, compare this range to current FPRs for the dry mixed conifer forests in California, and explore the silvicultural methods to reach these restoration and resilience targets. The Shared Stewardship agreement between the State of California and the USDA Forest Service (**Agreement for Shared Stewardship of California's Forests and Rangelands 2020**) acknowledges the need to reduce forest density and sets forth a plan wherein forests regulated by the state would be restored to improve resilience. This project explores how certain FPR guidance for silvicultural techniques such as shelterwood, group selection, and selection thinning may or may not facilitate resilience restoration targets; how contemporary FPR guidance may or may not be aligned with mid-century projections of forest sustainability and how past and present levels of stocking will compare with the coming future; and how post-fire measurements correlate with the amount of defect in individual coast redwood trees to elucidate the relationships between fire damage and bole decay from fire indicators and post-fire effects on live redwood.

A paper entitled "Operational resilience in western US frequent-fire forests" (**North et al. 2022**) was published in *Forest Ecology and Management* and shared with the EMC in 2024. Principal Investigator Dr. Rob York provided a presentation to the Forestry Forum in March 2022, and the presentation file was shared with the EMC in 2024 (**York 2022**); Ryan Tompkins gave a presentation at the California Licensed Forester's Association (CLFA) conference in March 2023 (**Tompkins 2023**); and Brandon Collins gave a presentation to Marin Wildfire Authority in June 2023 (**Collins 2023**). While the research plan had hoped to develop a demonstration site at Flatwoods in Shasta County, due to uncertainty in designating Flatwoods Research Forest as an experimental forestland, it is assumed that Baker Forest, a UC research property in Plumas County, will be used instead.

Field demonstrations of marking for tree vigor with Stand Density Index (SDI) occurred over the calendar year, with Dr. York leading this effort at Blodgett Forest; a research brief titled "Evaluating the Development and Application of Stand Density Index for the Management of Complex and Adaptive Forests " was published in February 2024 in *Current Forestry Reports* (**Chivhenge et al. 2024**). In May 2024, a presentation was provided to the Forest Landowners of California in (**York 2024a**); this presentation is also associated with EMC-2017-006. A written progress report was provided in June 2024 (**York 2024b**). Master of Forestry student Connie Ryan gave a presentation in May 2024 as part of the Master of Forestry finishing series, and while the EMC has not received that deliverable, Dr. York is seeking any associated files. The project is progressing as planned, with a final project report and presentation, yield impacts analysis, peer-reviewed publication, and CRAs anticipated in 2025.

EMC-2022-005 (9GA22702): Decay Rates and Fire Behavior of Woody Debris in Coastal Redwoods

This research investigates the effectiveness of the current FPRs in mitigating the wildfire hazard and risks for "normal" fire scenarios (i.e., conditions in which an initial attack is more likely to be successful) or in which fuel treatments have a higher likelihood of being effective. To that end, this study focuses on at industrial timberland slash treatments (e.g., lop and scatter) along public roads, specifically targeting Title 14 CCR 917.2 and Technical Addendum #2 – Cumulative Impacts, H. Wildfire risk and hazard (2-4) to determine if the rules are adequate to decrease fire behavior.

The project is progressing as planned, with a written status update provided to the EMC in June 2024 (**Norville 2024**), and a progress report presentation given at the November EMC meeting (**Norville and Jones 2024**). A second season of treatments and data collection continued in 2024. A final project report and presentation, a potential field tour, and CRAs are anticipated in early 2026, with submission of publications expected to occur in fall 2026. Outreach and engagement efforts, including conference presentations, UCCE-hosted field tours, and creation of a factsheet, are anticipated to begin in spring 2026.

EMC-2023-002 (9GA23701): Assessing Fire Hazard, Risk, and Post Fire Recovery for Watercourse and Lake Protection Zones (WLPZ) and Riparian Areas of California

The project is conducting several assessments on past fire history, current fire hazard, and county level vegetation recovery for WLPZ areas of California. Fire history will include an assessment of total acres burned by severity for all fires back to 1984 using available vegetation burn severity data. Current fire hazard (flame length and fire type) will be assessed using statewide fire hazard data updated for 2022. Within Plumas County, the dominant vegetation cover of all WLPZ areas will be assessed using a time series analysis to compare changes or no changes in forest, shrub, herbaceous, and barren cover types across all land ownerships and burn severities. The project will answer the following questions:

- What is the extent of total acres burned and acres burned by severity class (low, moderate, high) for all WLPZ areas in California since 1984?
- At the HUC 12 level, which individual watersheds have experienced the greatest percentage of high severity fire since 1984?
- What is the current fire hazard in all WLPZ areas, including potential flame length and fire type (surface fire, passive crown fire, active crown fire)?
- Within Plumas County, what are the trends in forest, shrub, grassland, and barren cover for all WLPZ areas since 1984?
- How is current vegetation cover type influenced by past fire severity, pre-wildfire management actions (fuels reduction), and post wildfire reforestation and recovery?

To date, project work has progressed as planned, and Nick Miley of Spatial Informatics Group provided a progress report presentation was provided to the EMC in November 2024 (**Miley 2024**). A project summary summarizes the work conducted in 2024 (**Saah and Moghaddas 2025**). The data used in this project are neither centrally located, nor complete. For example, WLPZ TA83 hydrology data are split into separate datasets for lakes and streams. Similarly, data gathering for THPs, HUC-12, land ownership, and burn severity required aggregation and integration measures. Harvest exclusion buffers were added to TA83 data with overlaps removed deferring to higher order WLPZ classification; similar actions were applied to HUC/CDFW hydrology layers for statewide analysis. Data were clipped to the project area, mapped, and evaluated for quality and accuracy.

The Post Fire Vegetation Monitoring Tool (PFVMT) was updated to ensure implementation of the most recent version of the data for analysis. Using the PFVMT data, exploratory analysis of vegetation was conducted within WLPZs in Plumas County. Methodology was refined and applied to five fires in Plumas County (Storrie, Chips, Moonlight, North Complex, and Dixie Fires) and various timber harvest types (see

project map: **Calfire EMC Riparian Fire**[10]). Exploratory statistical analysis is ongoing, including spatially continuous analysis in and around WLPZs in Plumas County for Monitoring Trends in Burn Severity (MTBS), annual burn probability, and Normalized Difference Vegetation Index (NDVI). A statewide WLPZ burn analysis dashboard is being developed county by county to explore fire statistics (e.g., acres burned, severity) in WLPZs since 1970 (see **PC537 Hydro Lines vs Fires**[11]).

Early exploratory analyses suggest there may be detectable differences in fire outcomes (i.e., burn severity) in WLPZs adjacent to timber harvest as compared to WLPZs that lack nearby timber harvest, though effect sizes are relatively small and variable. Harvest type (e.g. even-aged vs not even-aged), WLPZ classification, and fire size appear to be significant variables that correlate with burn severity outcomes within WLPZs. A significant percentage of WLPZs have experienced wildfire in the last 50 years–the majority occurring in the last 10 years. For example, in 2020, 435,000 acres of WLPZ burned, and 34% of those WLPZs affected by fire burned at high severity.

A key challenge has been signal detection given coarse remote sensing resolution (30 meters) and patchwork of harvests and harvest types within the study area, along with the narrow band of interest (no greater than 150 ft on either side) that demarcates a WLPZ. Solutions may include the use of spatially continuous analysis techniques moving from stream center/lake shore out or binning similar variables such as WLPZ classes (I and II, III and IV) and certain timber harvest types. Moreover, the complexity of variables contributing to wildfire spread and severity dilute signal detection of discrete variables such as timber harvest type, year of harvest completion, and WLPZ classification. Solutions may include binning similar variables to increase sample size or focusing on subtle differences in fire outcome. The lack of a comprehensive, statewide dataset for WLPZ classification is also a challenge. Solutions may include splitting the dataset by WLPZs that intersect timber harvest with those that do not to create a pseudo-control treatment.

Additional challenges have been encountered. The CAL FIRE TA83 dataset is not spatially aligned with the HUC/CDFW watershed datasets. A solution may be to run separate analyses on the two datasets that take advantage of the unique characteristics of each. Furthermore, when looking at individual timber harvest types, the acreage available for analysis varies significantly. The sample size is further limited by those timber harvests that intersect WLPZs. Solutions may include providing sample size (acreage) values for signal strength context or binning similar variables to increase sample size.

This project is beginning to shed light on how regulatory buffers—designed for water protection—may interact with wildfire outcomes in managed forests. In 2025, the PIs will complete statistical modeling of burn severity as a function of WLPZ presence, finish the burn and recovery vegetation analysis, finalize the statewide fire analysis dashboard, and draft a final report for the EMC summarizing findings and policy implications, including a Pre-harvest Fuels Summary Report. Additional work will assess whether specific FPR guidance (e.g., WLPZ buffer width, harvest restriction) aligns with observed fire effects.

[10] https://gsal.sig-gis.com/portal/apps/experiencebuilder/experience/?id=16d2e70373fa40a2b007b42b48147b37&page=Plumas-County

[11] https://gsal.sig-gis.com/portal/apps/dashboards/75b9d9d44911440c871c61ba011cbab6

EMC-2023-003 (9GA23700): Pre- and Post-Harvest Fuel Loads and Implications for Site Development and Productivity

In partnership with Humboldt and Mendocino Redwood Companies, Oregon State University are conducting a systematic pre-and post-harvest fuel loading study to understand how commonly applied forest management regimes combined with prescribed fuels reduction treatments affect fuels loading and associated wildfire hazard, tree regeneration, and site productivity/health. This study follows multiple replicate harvest units from pre-harvest measurements to determine how site vegetation has been affected by slash treatment and vegetation management conducted for wildfire hazard mitigation. Member Hostler was assigned to be the Project Liaison at the January EMC meeting, and Member Sal Chinnicci provided a status update at the July meeting, reporting that study sites were identified, and fieldwork would start the following week. Graduate student Julia Wine began work in June 2024 as a summer technician. Humboldt and Mendocino Redwood Companies assisted in site selection and field visit coordination for ten weeks of sampling during 2024. Pre-harvest data was collected on 40 sites and post-harvest data on 3 sites. Additional data will be collected and analyzed in 2025.

VI. POTENTIAL EMC PROJECT IMPACTS TO REGULATIONS

The EMC provides valuable insight to the Board on testing the effectiveness of the FPRs and associated regulations by way of science-based research projects. EMC-funded studies may show that regulatory modifications, either minor or major, need to occur to ensure the effectiveness of the FPRs (14 CCR § 895 et seq.). The EMC moved findings from EMC-2018-003 (Alternative Meadow Restoration) to the Board for consideration in 2024. This research project represents a partial validation of the current FPRs, particularly CFR § 933.4[e] regarding Meadows and Wet Areas restoration, but generally incremental progress in our understanding of how to balance meadow restoration 'other goals of forest management'. The final CRA (**O'Connor and Love-Anderegg 2024b**) for this project will also be presented to the Management Committee in March 2025 to allow for discussion of potential impacts to regulations, and implications for potential rule changes, if any.

The EMC anticipates sharing additional findings for the following EMC-supported studies with the Board for consideration in 2025 or 2026:

- EMC-2016-003: Road Rules Effectiveness at Reducing Mass Wasting (Repeat LiDAR Surveys to Detect Landslides
- EMC-2017-002: Boggs Mountain Demonstration State Forest (BMDSF) Post-Fire Automated Bird Recorders Study
- EMC-2017-006: Fuel Treatment Alternatives in Riparian Zones of the Sierra Nevada
- EMC-2017-007: The Life Cycle of Dead Trees and Implications for Management
- EMC-2018-003: Alternative Meadow Restoration
- EMC-2018-006: Effect of Forest Practice Rules on Restoring Canopy Closure, Water Temperature, & Primary Productivity
- EMC-2019-002: Evaluating Treatment Longevity and Maintenance Needs for Fuel Reduction Projects Implemented in the Wildland Urban Interface of Plumas County, CA
- EMC-2019-003: Fuel Treatments and Hydrologic Implications in the Sierra Nevada

- EMC-2021-003: Evaluating the Response of Native Pollinators to Fuel-Reduction Treatments in Managed Conifer Forests
- EMC-2022-004: A Critical Evaluation of Forest Practice Regulation's Capacity to Accommodate Forest Restoration and Resilience Targets
- EMC-2023-002 (9GA23701): Assessing Fire Hazard, Risk, and Post Fire Recovery for Watercourse and Lake Protection Zones (WLPZ) and Riparian Areas of California

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