Attachment 1

Photo 1: Mt Tam from Summit Ave.

Vegetation Management Report

Fiscal Year 2025

MARIN WATER

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Executive Summary

Each year, the Marin Municipal Water District (district) plans, monitors, and performs actions to reduce the risk of wildfire and improve the resiliency and biodiversity of its lands. Vegetation management activities are tracked and monitored so the district may adapt its actions and adjust to new information. This report is part of that adaptive management cycle. The Biodiversity, Fire, and Fuels Integrated Plan (BFFIP) is being implemented under an adaptive management framework. Per the BFFIP and Environmental Impact Report "The district will evaluate the effectiveness of annual management actions based on the findings from monitoring results. An annual board report will include the findings from monitoring and any recommendations made by District staff for modifications to methods and/or the schedule of preservations and restoration actions".

The first section covers coordination and planning to reduce wildfire risk, such as watershed closures during Red Flag Warnings; working with PG&E, lessees, and neighbors on defensible space; and coordinating with County Fire. The second section details planning, inventorying, monitoring and compliance work to support vegetation management. The third section shows the results of on-the-ground actions taken for fuel reduction and biodiversity and habitat enhancement. The fourth section describes the district's verification and monitoring of compliance with mitigation measure requirements. The fifth section lays out the work planning and recommendations for fiscal year (FY) 2026. Table 1 below provides a summary of the district activities that occurred in FY25. Map 1 (Page ES-5) provides a summary showing the locations of vegetation management activities.

Table 1 Overview of Vegetation Management Activities

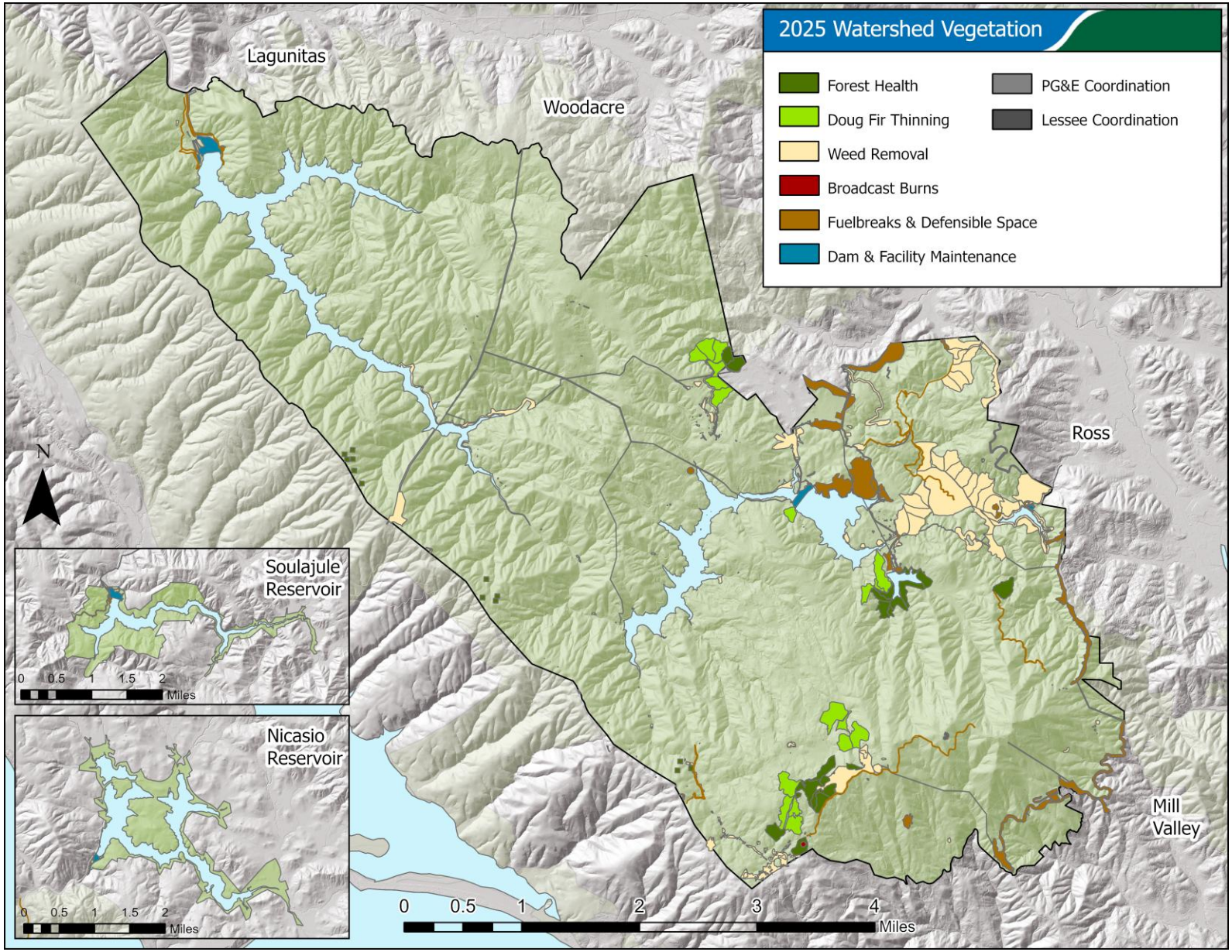
Completed Work	Outcome	Approximate Cost [a]	Description
Community Coordination for Fire Risk Reduction		**$8,502**	
Red Flag Warnings	Watershed Closures	N/A	• Closed Watershed for 8 days due to Red Flag Warnings. • Community outreach for red flag and other critical fire weather events through signage and social media.
Coordination with PG&E	67 Acres	$3,600	• Managed PG&E access through permits to support cyclical vegetation maintenance around and under transmission lines. • PG&E surveyed and cleared vegetation along 27 miles of power lines across the watershed. • PG&E repaired/replaced 19 pieces of hardware maintenance along the Distribution system throughout the watershed. See section 1.2 for detail.
Coordination with Lessees and Neighbors on Defensible Space	2 Acres	$1,200	• Coordinating under existing lease agreement to prioritize maintenance funding for vegetation maintenance around infrastructure. • Coordinated with the West Point Inn, and a PG&E leased facility at Middle Peak.
County Fire Coordination	County and Watershed Wide	N/A	• Burned 1 Rx Units near Rock Springs in Coordination with MCFD. • Provided direction and support for development of Marin's Community Wildfire Protection Plan in collaboration with Marin County Fire and FIRESafe Marin. • Attended monthly FIRESafe Marin Meetings. • Coordinated with One Tam and CA Dept of Conservation to structure a proposed block grant agreement to support further fuel reduction and wildfire resilience work.
Watershed Volunteer Coordination	Wildfire Resilience	N/A	• Expanded Defensible Space. • Contributed to EDRR Efforts. • Improved Forest Health. • Removed Invasive Species.

Planning, Compliance and Monitoring		**$386,540**	
Biodiversity, Fire, and Fuels Integrated Plan (BFFIP)		N/A	• Implemented BFFIP Year 6 Targets.
Non-Native Invasive Species Mapping	Updated Records	N/A	• 953 invasive plant records updated.
Rare Plant Surveys	Rare plant compliance surveyed	$67,692	• 64 acres surveyed for rare plants ahead of vegetation management projects. • 116 Rare Plant Records Created.
Northern Spotted Owl Surveys	Nesting compliance	$93.712	• Completed environmental compliance survey work for northern spotted owl to support watershed vegetation and construction related projects.
Bat Surveys	Roosting bat habitat surveys	N/A	• In FY25 the District did not encounter any internal situations requiring Bat Roost Surveys. • District required PG&E to comply with Bat Roost Surveys and related BMPs.
Bird Surveys	Nesting Birds	$78,273	• Completed environmental compliance survey work for nesting birds to support vegetation management work.
Tri-Annual Land Bird Survey	Nesting Birds	$35,261	• Tri Annual Land Bird Survey.
Nesting Bird Response to BFFIP Treatment Monitoring	Annual Monitoring	$27,388	• Correlated FYE vegetation data against historical nesting data to determine impact of BFFIP implementation on nesting birds.
Osprey Monitoring	Annual Monitoring	$4,999	• Completed annual Osprey monitoring at Kent Lake.
Forest Restoration Monitoring and Mapping	Maintenance of Existing Areas	NA	• Routine Maintenance of 14 acres of Forest Habitat in the Resilient Forest Project Area. Costs for this activity are contained in the Vegetation Management section.
Foothill Yellow Legged Frog	Annual Monitoring	$53,256	• Completed annual monitoring of foothill yellow legged frogs at select watershed locations with known occurrences.
Wildlife Picture Index	Data Processing	$3,961	• Processed photos and analyzed data from thousands of wildlife photos taken on District Land.
Cultural Resource Surveys	Cultural Resource Surveys	$18,629	• Completed Cultural Resource Surveys on proposed Rx Burn Sites.

Wildfire Pathway Report	Detailed Recommendations for Future Fuel Treatments	$3,369	• Received report detailing effectiveness of existing and planned fuel treatments on arrival time of wildfire under different scenarios.
Vegetation Management	**FY25 BFFIP Implementation**	**$3,624,484**	
Cyclical Maintenance of Fuelbreaks	**931 acres**	**$1,397,828**	• **All fuelbreaks maintained at appropriate intervals**
	199 acres	$347,711	• Fuelbreak maintenance, cutting of woody vegetation & pile burns.
	50 acres	$16,143	• Mowed fine fuels around structures, roadsides and parking areas.
	590 acres	$953,048	• Pulled/mowed broom.
	50 acres	$91,244	• Mowed non-fuelbreak roadsides.
	43 acres	$51,562	• Managed vegetation on dams and spillways.
New Fuelbreak Construction	**6 acres**	**$229,673**	• **Contractors expanded defensible space at Taylor Trail Fuelbreak**
Forest Restoration and Fuel Management	**153 acres**	**$556,310**	• **Forest and Woodland Thinning to Promote Resilience**
	9 acres	$61,200	• Initial Forest Fuel Reduction.
	143 acres	$482,702	• Maintenance of Forest Restoration sites & Pile Burning in Forests.
	1 acre	$12,408	• Broadcast burn in forest at Mt Theater.
Priority Habitat Restoration & Fuel Reduction	**426 acres**	**$1,440,673**	• **Removal of target invasive weeds within forest and woodlands**
	193 acres	$1,357,494	• Douglas fir thinning in Oak Woodlands and Grasslands (OW&G).
	0 acres	$0	• Broadcast burn in grassland at Ridgecrest site.
	16 acres	$8,000	• Goatgrass reduction in OW&G.
	129 acres	$30,136	• Yellow Starthistle management in OW&G.
	88 acres	$45,043	• Control of other priority weeds in OW&G.

Early Detection Rapid Response	**N/A**	**One Tam Contribution**	• 20 miles of roads, trails and lakeshores surveyed. • 65 Supplemental Acres of Survey work. • 58 New Detections of Invasive Weeds • 73 patches of invasive weeds treated in FY25.
Experiment with New Invasive Species Control Methods	**1 Trial (Ongoing)**	**$0**	• Monitoring of Blackwood Acacia peeled in FY24. 14 Individuals & 7 stumps.
Implementation Supplies		**$5,830**	• CalFlora Subscription, Flagging Tape, and Weed Pullers.

Map 1: FY25 Vegetation Treatments by Management Action



1 Coordination to Reduce Wildfire Risk

The district is responsible for managing its watershed lands, which includes minimizing the risk of wildfires. Over 25,000 structures housing approximately 45,000 residents are within two miles of district lands along a WUI that has a CalFire Fire Hazard rating of "High" to "Very High." Wildfire also poses a threat to water quality and distribution, and to the ecosystem functions and values provided by watershed lands. Climate change, forest diseases, and the proliferation of weeds increase the potential for large wildfires.

This section details approaches to reduce the potential for fire ignitions and hazards through coordination with other agencies and landowners, as well as continuing best management practices to minimize ignition potential particularly during high-risk events. Adjacent to the watershed there are approximately 300 private properties, the remainder of the district's lands are surrounded by State, Federal and other local agencies lands. Vegetation management actions are summarized in Section 3 Vegetation Management.

Work	Outcome	Approximate Cost	Description
Community Coordination for Fire Risk Reduction		**$4,800**	• Wildfire risk mitigation
Red Flag Warnings		N/A	• 8 Red Flag Warning Closures in FY25. • Continued community outreach for red flag and other critical fire weather events through signage and social media. • Coordinating county wide signage with Fire Safe Marin and other Fire agencies.
Coordination with PG&E	27 Miles of Lines Maintained (67 Acres)	$3,600	• Coordinating to ensure cyclical vegetation maintenance around and under transmission & distribution lines. • Maintained Vegetation along 27 miles of PG&E transmission and distribution lines, totaling 67 acres. • PG&E repaired/replaced 19 pieces of hardware along the Transmission & Distribution system throughout the watershed. See section 1.2 for detail. • Worked with PG&E to ensure that pre-project environmental surveys are completed before vegetation management work is conducted.
Coordination with Lessees and Neighbors on Defensible Space	2 acres	$1,200	• Coordinating under existing lease agreement to prioritize maintenance funding for vegetation maintenance around infrastructure. • Conducted assessments of fuelbreak infrastructure and defensible space to inform annual maintenance activities.
County Fire Coordination	NA	NA	• Conducted one Rx Broadcast Burnson Watershed Land. • Prepared the Knob II Rx Burn Site for a burn, that was ultimately conducted on 7/1/25 (FY26). • Provided direction and support for development of Marin's Community Wildfire Protection Plan in collaboration with Marin County Fire and FIRESafe Marin. • Collaborated on Watershed Prescribed Fire Report. • Attended monthly FIRESafe Marin Meetings.

Watershed Volunteer Coordination	Wildfire Resilience	N/A	• Expanded Defensible Space • Contributed to EDRR Efforts • Improved Forest Health • Broom Removal

1.1 Red Flag Warnings

Small fire events have occurred on district lands between 2006 and 2025. To reduce the potential for ignition during severe weather events the district coordinates with County Fire, and California State Parks to close sections of the watershed to automotive traffic during red-flag warnings. It is, therefore, imperative that the district be prepared to respond to fire events that occur on district lands. As such the district maintains operational readiness for initial attack and wildfire support services. The district currently has 14 trained and Red Carded wildland fire fighters. Ranger and Watershed Maintenance staff conduct monthly trainings.

The target is to regularly (annually or more frequently, as needed) train staff in Red-Flag Day protocols, ignition prevention BMPs, wildland firefighting techniques, and firefighting equipment maintenance.

- Closed the Watershed for 8 days due to Red Flag Warnings.
- Continued community outreach for red flag and other critical fire weather events through community signage and social media.
- Participated in County wide red-flag sign coordination.
- Installed and operating additional wildfire danger signs.

Photo 2: Fire Danger Signs at Main Entrance.

Outcome	Total Closures
Watershed Closures	8

Photo 3: Fire Danger Signs posted in picnic areas.

1.2 Coordination with PG&E

PG&E-owned transmission lines and transformers are located within district lands. PG&E is responsible for maintaining clearance around transmission lines to minimize the potential for wildfires. The district will facilitate PG&E access for the purpose of vegetation management associated with their distribution and transmission lines and transformers. The target is to coordinate annually (or more frequently, as

needed) with PG&E to ensure cyclical and emergency vegetation management occurs as needed under power lines and transformers.

- Coordinated vegetation management treatments along 27 miles of PG&E lines totaling 67 acres.
- PG&E performed 19 hardware maintenance activities on Distribution & Transmission Lines throughout the Watershed: See Table.

Activity	Sum
Repair	**3**
Guy Wire-Wood	1
Insulator	1
Switch	1
Replace	**11**
Anchor-Wood	2
Conductor-Wood	1
Connector	2
Pole	6
Install	**3**
Guy Wire-Metal	1
High Sign	2
Remove	**2**
Underground facility	1
Overhead facility	1
TOTAL	**19**

Photo 3: PG&E Sub prepping for veg work near Sky Oaks Rd.

Outcome	Approximate Cost
Coordinated vegetation management along 27 miles of Transmission & Distribution Lines totaling 67 acres.	**$3,600**

1.3 Coordination with Lessees

The district has entered into leases or easements with other parties that own facilities that are located within district lands. It is the responsibility of these other parties to conduct vegetation management activities around those facilities. The district performs annual inspections of leased areas and works with lessees to ensure vegetation management work is completed. The target is to coordinate annually (or more frequently as needed) with other parties that have entered into a lease or easement with the district, to ensure cyclical maintenance of fuelbreaks and other vegetation management activities occur around these facilities on district lands.

- West Point Inn
- PG&E Leased Facility at Middle Peak

Outcome	Approximate Cost
2 Acres	**$1,200**

Photo 4: Fuelbreak Maintenance at the PG&E leased Middle Peak site.

1.4 Wildfire Coordination

The district is located adjacent to lands that are managed by other agencies, including private, county, state, and federal agencies. The district partners with these agencies and local fire departments to encourage the adequate management of fuels along common borders. District personnel attend monthly FIRESafe Marin meetings and participate in countywide Community Wildfire Protection Plan annual work plans and plan updates. Through the year district staff are coordinating with local fire departments to improve community education regarding defensible space, ongoing vegetation maintenance, and ongoing emergency response. Additionally, the districts Ranger staff and Watershed Maintenance staff carry out regular trainings relating to wildfire preparedness. The District is continuing to coordinate fuels management work with Marin Wildfire Prevention Authority (MWPA) agency through ongoing involvement in the Technical Advisory committee. This coordination is helping facilitate cross jurisdictional planning and management. In an effort to scale vegetation management effort the district is also working with the One Tam collaborative and County Fire to leverage the County Wide Vegetation Map to create an updated fuels profile for vegetated lands across Marin County, which will help to inform and prioritize fuel reduction efforts. In FY 2025 agency partners collaborated on the One Tam Forest Health Strategy to develop multi-benefit forest restoration priorities.

Ongoing wildfire coordination efforts:

- Marin Wildfire Prevention Authority (MWPA)
- Prescribed fire planning with MCF and BAAQMD
- MMWD/MCF Mutual Aid Agreement, including Tam Fire and Fire Foundry Crews

- Fire Safe Marin Board
- Marin Prescribe Fire Cooperative
- Defensible space with SMF & RVF
- Ongoing wildland fire trainings with MCF
- One Tam Forest Health Strategy
- TOGETHER Bay Area's Wildfire Data Working Group
- Working with OneTam partners to coordinate Resource Advisor readiness and standards for post-wildfire rehabilitation.

Photo 5: CA Wildfire Task Force Tour of Watershed Fuels Treatments.

1.5 Watershed Volunteer Coordination

The Watershed Volunteer Program hosed several events in FY25 focused on Wildfire Fuels Reduction and implementation of BFFIP objectives. Volunteer events included 9 Volunteer broom pulling events, which includes the annual Bald Hill Broom bust in partnership with Marin County Parks, and collaboration with Marin Stables. Additionally Volunteer crews removed other invasive weeds, like Ox Eye Daisy and Ehrharta, removed encroaching Douglas Fir, and lead nature hikes through Fuels Treatment areas.

Photo 6: Bald Hill Broom Bust Volunteer Event

2 Planning, Monitoring and Environmental Compliance

Another charge of the district is to protect important biological resources and ecosystem functions on the district's lands. Enhancing ecosystem resiliency is a key strategy for the district to pursue. Resiliency is defined as an ecosystem's ability to absorb shocks or perturbations and still retain desirable ecological functions, such as the ability to provide breeding and foraging habitat for wildlife; the ability to support significant biological resources such as rare, threatened, or endangered species; the ability to regenerate desired plant communities following a disturbance such as wildfire; the ability to cycle nutrients; and the ability to protect water quality. As part of the district's vegetation management actions environmental compliance surveys are completed to ensure the district's work doesn't negatively impact sensitive resources.

The work in this section focuses on planning for vegetation management actions, inventorying and monitoring key natural resources, and performing actions related to environmental compliance.

Completed Work	Outcome	Approximate Cost	Description
Planning and Monitoring		**$386,540**	
BFFIP Implementation		N/A	• Implemented BFFIP Year 6 Targets.
Non-Native Invasive Plant Species Mapping	Updated Records	N/A	• 953 Invasive Plant observations in FY25.
Rare Plant Compliance	64 Acres Surveyed	$67,692	• MMWD Contractors and staff conducted 64 acres of rare plant surveys in potential project areas.
Northern Spotted Owl Surveys	Compliance	$93,712	• Completed environmental compliance survey work for northern spotted owl to support watershed vegetation and construction related projects.
Bat Surveys	Roosting Bat Habitat Surveys	N/A	• Removing trees > 10" DBH requires Bat Roost Surveys. • In FY25 the District did not encounter any internal situations requiring Bat Roost Surveys. • The District required PG&E to conduct appropriate Bat Surveys prior to removing trees > 10" DBH on multiple occasions in FY25.
Bird Surveys	Nesting Birds	$78,273	• Completed environmental compliance survey work for nesting birds to support vegetation management work.
Tri-Annual Land Bird Survey	Nesting Birds	$35,261	• Completed Tri-annual Survey Work

Osprey Monitoring	Annual Monitoring	$4,999	• Annual Osprey monitoring at Kent Lake.
Forest Restoration Monitoring and Mapping	Maintenance of Existing Areas	NA	• Routine Maintenance of 14 acres of Forest Habitat in the Resilient Forest Project Area. See Vegetation Management Section for Costs.
Foothill Yellow Legged Frog	Annual Monitoring	$53,256	• Annual monitoring of foothill yellow legged frog at select watershed locations.
Wildlife Picture Index	Data Processing	$3.961	• Input and analyzed thousands of wildlife photos taken on District Land.
Nesting Bird Response to BFFIP Treatments	Annual Monitoring	$27,388	• Analyzed FYE Vegetation Data against historical nesting activity data to determine impact of BFFIP implementation on nesting birds. Report received, see Appendix C.
Cultural Resource Study	Surveys	$18,629	• Coordinated with FIGR and SSU in preparation for Rx burns at multiple Watershed sites.
Wildfire Pathway Report	Recommendations for Future Fuel Treatments	$3,369	• Received report detailing effectiveness of existing and planned fuel treatments on arrival time of wildfire under different scenarios. See Appendix B.

2.1 Biodiversity, Fire and Fuels Integrated Plan

In an effort to expand vegetation management work to reduce fuel loads and wildfire hazards on watershed lands the district has developed the Biodiversity, Fire and Fuels Integrated Plan (BFFIP). The BFFIP supersedes the 1995 Vegetation Management Plan (VMP), which the District operates under from 1995-2019. The BFFIP was approved by the District's Board of Directors and as such, is considered a discretionary action and subject to the California Environmental Quality Act (CEQA). As part of the CEQA process the district held a public meeting to inform the community and circulated the Draft Environmental Impact Report for public review from March 21, 2019 through June 19, 2019. The Plan and EIR were adopted on October 16, 2019.

- BFFIP adopted in October of 2019
- Addendum adopted in 2023.

Outcome	Approximate Cost
Implementation of Year 6	**N/A**

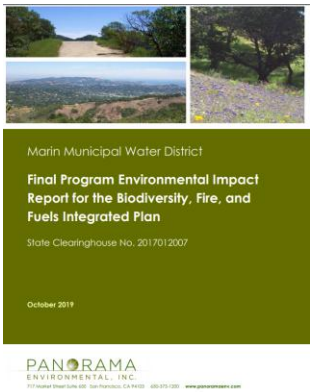


Figure 1: BFFIP EIR adopted in October of 2019.

2.2 Non-Native Invasive Species Mapping

To support the vegetation management actions that will be conducted by the district, the district needs to properly understand the location of invasive species and the extent that invasive species have spread on district lands. The district will continue to regularly update invasive species map. The target is to annually update the maps of invasive species. This information helps to inform vegetation management priorities and annual work plans.

The District completed a French Broom mapping update in FY 2018/2019 and is continuing with watershed wide Early Detection Rapid Response surveying as well as management of priority weeds.

Outcome	Approximate Cost
953 Records Updated	**One Tam Contribution & MMWD Staff**

2.3 Early Detection & Rapid Response (EDRR)

In FY24 Marin Water coordinated with an experienced EDRR team at Golden Gate National Parks Conservancy to conduct surveys on 20 miles the Marin Watershed's roads and trails. Results as follows:

- 10 miles EDRR on roads and trails
- 10 miles supplemental searching for stinkwort (Dittrichia graveolens) on roads, trails, and lakeshores
- 59 acres supplemental searching for thoroughwort (Ageratina adenophora) in drainages
- 58 new detections of invasive weeds
    - 12 of the new detections are listed as Priority 1, including stinkwort, hanging sedge (Carex pendula), smilograss (Stipa miliacea), and old man's beard (Clematis vitalba)
    - 2 new detections of thoroughwort
    - 2 new detections of yellow starthistle (Centaurea solstitialis)
    - 6 new detections of jubata grass (Cortaderia jubata)
    - 1 new detection of licorice plant (Helichrysum petiolare)
- 6.36 acres of Tamalpais Lessingia (Lessingia micradenia var. micradenia) mapping
- 0.5 acres of Marin dwarf flax (Hesperolinon congestum) monitoring

Vegetation management and construction projects have the potential to introduce, spread, or create conditions for the spread of invasive plant species. Experience has shown that proactive efforts to catch these plant infestations early are key to protecting the integrity of the habitat.

2.4 Rare Plant Compliance

To support the district's goal to preserve existing significant biological resources, including rare plants and sensitive natural communities, the district collects field data and updates watershed data on an ongoing basis. The objective is to ensure that all management actions taken on the Watershed have no significant negative impact on rare plants or sensitive natural communities. This information also helps the district track long-term trends and changes on the watershed and guides restoration planning efforts.

In FY19 the District completed a Rare Plant Inventory which is identified as a Monitoring Management Action in the BFFIP for year one. Since that time the district focused on rare plant compliance surveys to facilitate vegetation management and other watershed projects over the next 5 years.

In FY25 64 acres were surveyed for rare plant Compliance primarily along the Southern Watershed border with Mill Valley where Marin Wildfire Prevention Authority has plans to construct another Fuelbreak.

Outcome	Approximate Cost
64 Acres	**$67,692**

Photo 7: Gairdner's Yampa (Perideridia gairdneri ssp. gairdneri)

Robert Steers – Panorama Environmental 2024

2.5 Spotted Owl, Osprey, Wildlife and Migratory Bird Surveys

To facilitate vegetation management activities on the watershed the district carries out a number of pre-project biological surveys to minimize potential impacts. The survey results determine the mitigation or avoidance measures the district applies while carrying out vegetation management work. It's also a good way for the district to collect valuable biological data to monitor the long-term trends associated with biological resources on watershed lands. Surveys and monitoring work ensures that the district is complying with the regulations lined out in the Endangered Species Act and the Migratory Bird Treaty Act.

- Comprehensive district-wide northern spotted owl nesting surveys conducted.
- Nesting bird project surveys conducted in advance of all new vegetation work.
- Completed annual monitoring of Osprey at Kent Lake.
- Tri-annual Land Bird Survey
- BFFIP Treatment Impact Study

Photo 8: Compliance Photo showing location of Western Pacific Fly Catcher Nest Location.

-Mark McCaustland, Kleinfelder, 2025.

Photo 9: Northern Spotted Owl

-www.usgs.gov

Outcome	Approximate Cost
FY25 Compliance surveys (combined)	**$176,984**

2.6 Bird Response to BFFIP Treatments

Point Blue Conservation Science studied the impact of BFFIP treatments on land bird abundance and species richness using a comparison of existing tri-annual land bird data and fiscal year end BFFIP vegetation data between 2019 (pre BFFIP) and 2022 (post BFFIP).

No evidence was found of significant negative effects of BFFIP treatments on the watershed bird community. Instead results suggest neutral or possible positive responses of overall bird community abundance and species richness to BFFIP treatments analyzed.

The above report was received in early FY25, and presented at the September 2024 Watershed Committee Meeting. See Appendix C for the Executive Summary.

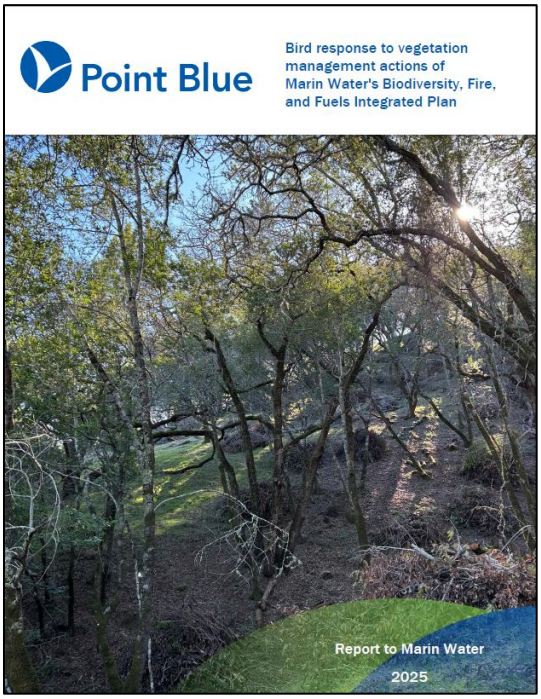


Figure 2: Point Blue Report to Marin Water

2.7 Resilient Forest Monitoring & Forest Restoration Planning

The District is collaborating with the U.S. Forest Service, Cal Poly, and UC Davis to monitor greenhouse gas balance and water yield in Forest Restoration sites through pre-treatment and post-treatment data collection within a pilot treatment area. Monitoring was paused in FY21 due to COVID, but maintenance of the sites continues. The District also collaborated with One Tam Partners to develop the regional Forest Health Strategy through leveraging data from the recently complete County Wide Vegetation Map to identify opportunities for future forest restoration efforts. One Tam recently published the Forest Health Strategy.

- Mapping of forestry restoration projects to support Cal Fire Forest Health Grant and future work areas.
- Working with One Tam on Forest Health Strategy to guide multi-benefit forestry restoration work.

Outcome	Approximate Cost
Maintenance of 14 Resilient Forest Sites	**N/A (See Section 3.3)**

2.8 Foothill Yellow Legged Frog Monitoring

Since 2004, MMWD has conducted annual population monitoring of foothill yellow legged frogs (FYLF) on the Mt. Tamalpais Watershed. The FYLF is designated as a Federal and Species of Concern. The California Department of Fish and Wildlife also designates the FYLF as a California Species of Special Concern. Monitoring sites for FYLF are conducted at two known breeding sites within the Mt. Tamalpais Watershed, Little Carson Creek and Big Carson Creek, both of which flow into Kent Lake. The annual monitoring of FYLF populations informs district vegetation work within their known habitats.

In FY23 the District thinned the vegetation around the intersection of Carson Creek and Pine Mt Rd to allow additional daylight into the creek bed and improve FYLF habitat.

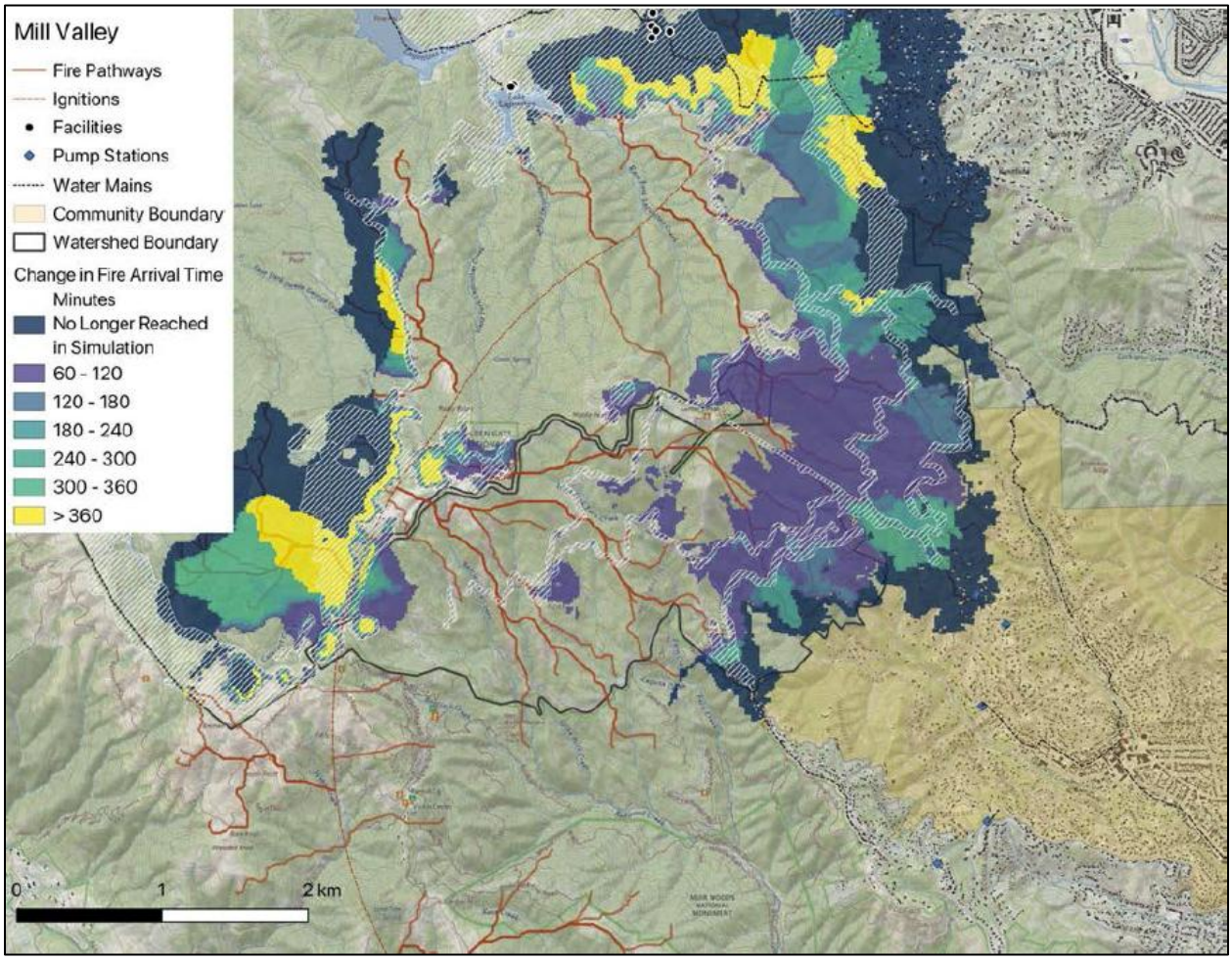
Outcome	Approximate Cost
Annual Monitoring & Veg Maintenance	**$53,256**

Photo 10: Foothill Yellow-legged Frog

2.9 Wildfire Pathway Modeling

In FY25 Marin Water contracted with Willow Labs to perform watershed-wide wildfire pathway modeling to evaluate the most likely path of wildfire and the efficacy of existing and proposed fuel treatments.

The study found that the recent Phase I (2020-2024) multi-benefit vegetation management projects have been highly successful at limiting fire growth towards Marin Water assets central portion of the Mount Tamalpais Watershed and to adjacent southern and central Marin communities. There are opportunities for additional vegetation management in the northern and western portions of the Watershed to further mitigate the risk of fast-moving fires to infrastructure and adjacent communities in these areas.



Map 2: Change in Fire Arrival Time - Post fuels treatment. Scenario shown in a westerly wind event with an ignition 3km to the west of Mill Valley.

Outcome	Cost
Phase I & II Report Received	$3,369

2.10 Cultural Resource Study

Marin Water contracted with Sonoma State University, in consultation with the Federated Indians of Granton Rancheria, to conduct a cultural resources study for proposed prescribed burns across multiple locations on the Watershed. As part of the One Tam Forest Health Strategy agency partners integrated FIGR's input into the final document to help guide work on public lands.

Outcome	Approximate Cost
Cultural Surveys for Rx Burn Sites	**$18,629**

2.11 Wildlife Picture Index

Wildlife Picture Index Project (WPI) is a method that combines statistical analysis of photos from wildlife cameras with other environmental data to help land managers learn about the presence of wildlife in our parks and open spaces.

The purpose of this project is to acquire statistically-viable wildlife data over a large geographic area on Mt. Tamalpais and adjacent public lands. While public land managers are aware of many of the species (bobcats, coyotes, badgers, etc.) that occupy these lands, much is still unknown regarding their abundance, how they move about, and how they use these lands at different times of the year. Understanding trends and patterns in wildlife use and behavior is essential to taking better care of our public wildlands.

Outcome	Approximate Cost
Wildlife Picture Index Data	**$3,961**

Photo 11: Wildlife Photo Index - Photo Example (Bobcat)

3 Vegetation Management

The district has been proactively managing vegetation to reduce wildfire hazards and preserve and enhance significant biological resources by implementing measures that were recommended in the 1995 VMP, as well as actions suggested by research and monitoring over the past decades. This section details actions undertaken to reduce wildfire risk, improve forest health, increase ecosystem resiliency and the status and function of other key natural systems and species. These actions primarily involve fuelbreak maintenance and construction, resilient forest projects, invasive plant management and restoration of native plant communities through reducing woody species encroachment.

Completed Work	Outcome	Approximate Cost	Description
Vegetation Management	**1,585 acres**	**$3,624,484**	
Cyclical Maintenance of Fuelbreaks	931 acres	$1,397,828	• Fuelbreaks maintained at appropriate intervals. • Cut woody vegetation in established fuelbreaks. • Mowed fine fuels around structures, along roadsides and parking areas. • Pulled broom from fuelbreaks. • Mowed non-fuelbreak roadsides. • Managed vegetation on dams and spillways.
New Fuelbreak Construction	6 acres	$229,673	• Contractors and staff expanded defensible near Fern Canyon Tank and Liberty Gulch Tanks.
Early Detection Rapid Response	20 Miles & 149 New Detections.	One Tam Contribution	• 20 miles of roads and trails surveyed. • 149 new weed populations identified.
Forest Fuel Management	153 acres	$556,310	• Forests maintained aat appropriate interval • Completed 9 acres of initial forest fuel reduction treatments near Rock Springs. • Maintained 142 acres of forest fuels including the burning of 75 acres of piled & cured vegetation across the Watershed. • Conducted a 1 acre Prescribed Burn in Forest land.
Priority Habitat Restoration and Fuel Reduction	426 acres	$1,440,673	• Improved grassland and oak woodland in the ecosystem restoration zones through Douglas fir thinning and management of priority non-native weeds.
Experiment with New Invasive Species Control Methods	1 Trial (Ongoing)	$0	• Acacia Peeling Treatment Monitoring
Implementation Supplies	-	$5,830	• CalFlora Subscription, Weed Pullers, & Flagging Tape

3.1 Cyclical Maintenance of Fuelbreaks

Fuelbreak Maintenance & Cutting of Woody Vegetation

A fuelbreak is a built asset requiring periodic maintenance to operate as intended. Fuelbreaks are strategically located blocks or strips of land where vegetation has been altered so that it has a low fuel volume and/or reduced flammability. Maintenance work is intended to maintain reduced fuel loads and stand structure that will slow fire spread and reduce flame lengths. Fuel reduction areas are maintained by re-cutting vegetation as warranted.

The target is for each fuelbreak to be re-treated on a cyclical basis, as needed to maintain desired fuel characteristics; each fuelbreak will be re-treated at least once every five years. Fuelbreaks remain effective only if they are continually maintained.

Fuelbreaks maintained in FY25 include:

- Scott Tank
- Fawn Ridge
- Knob II
- Bon Tempe Treatment Plant
- Sky Oaks Meadow
- Lagunitas Picnic Area
- Deer Park
- Phoenix Lake Shore

Outcome	Cost
199 Acres	$285,831

Photo 12: CCNB Crew performing Fuelbreak Maintenance at Phoenix Lake Shore.

Fine Fuel Reduction

Managing vegetation in the most risk-prone area, including parking lots, picnic areas, and defensible space around structure is a top priority. These areas, which are most risk-prone, are maintained by re-cutting vegetation, as warranted to keep grasses at 4 inches or less in height. The work is performed primarily with power tools such as string cutters, the district also uses heavy equipment with mowers. The vegetation is shredded and scattered on site as part of the cutting process with no additional treatment required. Soils are not disturbed.

All annual grass (fine fuel) defensible space maintained around Watershed facilities.

- Completed fine fuel reduction around all watershed facilities.

Outcome	Approximate Cost
47 acres	**$16,143**

Photo 13: Fine Fuel Reduction Work at Rock Springs Picnic Area.

Broom Work

On-going management and reduction of mature broom improves habitat quality for native flora and fauna. After the initial removal of a mature population of broom, maintenance occurs every one to two years. After two to three maintenance cycles the time and resources required to maintain that population decrease significantly. Similarly, after two to three maintenance cycles the District observes significantly more bio diversity in those locations. While the broom seed bank can persist for decades, a well

maintained area effectively re-populates with a mixture of plant species from adjacent units. Examples of locations under management that were once dominated by Broom include Sky Oaks Meadow, Indian Crown Fuelbreak, and Fawn Ridge Fuelbreak.

In FY24 the Management Actions for Broom in Fuelbreaks, Broom Maintenance, and Initial Broom Removal were combined into a single Management Action (i.e. Broom Work) to allow greater flexibility to maintain treated areas and more sustainably reduce the coverage of mature populations of broom.

In FY25 Broom was removed at 27 different management units totaling 591 acres.

Outcome	Approximate Cost
591 acres	**$953,048**

Photo 14: Broom Removal near Hidden Meadow.

Photos 15 & 16: Before / After Broom Work sequence near Porteous Residense.

Roadside Mowing (Non-Fuelbreak)

Vegetation management around roadsides is necessary to ensure the integrity of the infrastructure. The district continues to conduct roadside mowing on an as-needed basis to maintain unobstructed access for district vehicles and a clear line of sight for both district staff and recreationists. The work is performed with a combination of heavy equipment with cutting or masticating heads mounted on articulating arms and with power tools including chainsaws and brushcutters.

Roadside mowing sites:

- 5 Corners
- Peters Dam
- Soulajule
- E. Ridgecrest
- Middle Eldridge
- Tocaloma Pump Station
- Laurel Dell Fire Rd.

Outcome	Approximate Cost
51 Acres	**$91,244**

Photo 17: Roadside Mowing at Middle Eldridge

Dam Maintenance

Per CA Department of Water Resources – Division of Safety of Dams (DSOD), all woody vegetation was removed from district earthen dams. Cutting and disposing of any woody shrubs or trees on earthen dams

protects the structurally integrity, facilitates annual DSOD inspections and compliance with State regulations.

Dam maintenance sites:

- Phoenix Dam
- Lagunitas Dam
- Bon Tempe Dam
- Peters Dam
- Nicasio Dam
- Soulajule Dam

Outcome	Approximate Cost
43 acres	**$51,562**

Photo 18: Vegetation Maintenance at Peters Dam

3.2 New Fuelbreak Construction-MA 21

To facilitate firefighter access in the event of an ignition, the district has removed dead material, thinned canopies, and cleared brush along areas designated as fuelbreaks. Fuelbreaks infrastructure has been strategically designed based on detailed analyses of existing vegetation, fuel loads, slopes, slope aspect, and local climate data. The vast majority of proposed future construction is the widening or expansion of existing fuelbreaks to maximize their utility. Fuelbreak widening will be performed as crews are in the area performing cyclical maintenance in the existing system.

For FY25 new Fuelbreak construction focused on the Fern Canyon Tank and Liberty Gulch Tank Sites. Both sites were heavily overgrown, but prioritized for Wildfire safety.

Outcome	Approximate Cost
6 acres	**$229,673**

Photos 19 & 20: Before / After Sequence showing New Fuelbreak Construction at Liberty Gulch Tank.

3.2 Early Detection Rapid Response (EDRR)-MA 22

Eliminating new colonies of weeds is the most effective action aside from prevention that the district can take to preserve biodiversity (as well as reduce fuelbreak maintenance). EDRR includes regular surveys of parts of the watershed where weed invasion is most likely, and periodic surveys in remote areas where new weed invasions are likely to be less frequent. EDRR staff pull, cut, or dig out newly discovered invasions that area less than 100 square meters (0.02) in size; larger populations are flagged for later treatment by the district using watershed aides or contractors.

This fiscal year 20 miles of Roads & Trails plus 65 Supplemental Acres were surveyed. In FY25 58 new detections were identified, and 73 patches of invasive weeds were treated

Outcome	Approximate Cost
73 Populations of Weeds **20 Miles & 65 Acres of Surveys**	**One Tam Contribution**

Photo 21: Pampas Grass (Cortaderia jubata)

-Eric Goldbeck-Dimon

3.3 Initial Forest Fuel Reduction-MA 23

Reduce Accumulated Fuels and Brush Density

The district will reduce accumulated fuels and brush density in conifer and mixed hardwood forest to reduce wildfire risk and improve overall forest function. Thinning brush is an established means of promoting the growth of retained native trees by reducing the competition for light, nutrients, and water. The district is carrying out this work because over 10,000 acres of forests on district lands have been impacted by Sudden Oak Death (SOD) this has increased the fuel loads within the forest. Tanoak-dominated forest types have been the most heavily impacted: as the disease progresses, tanoaks drop out of the canopy resulting in fuel load build up, large openings in the canopy and an overall simplification in forest diversity and structures. FY25 forestry work was limited to the Rock Springs Expansion Project.

Outcome	Cost
9 Acres	$229,673

Photo 22: Mastication Treatment near Rock Springs.

Building on lessons learned from the prior year, all noisy work in the Rock Springs area paused on January 31st to allow for birds to nest without interruption. The Rock Springs area is challenging to work in due to the presence of various hawks and high quality nesting habitat for Northern Spotted Owl (NSO). Noise buffers for most hawks and NSO are 250ft and ¼ mile respectively, which makes noisy forestry in this area relatively expensive due to the survey requirements and avoidance. Work resumed in this area after nest season in August of FY26.

Monitoring of Forest Fuel Reduction work on understory herbs and tree recruitment is performed at multiple transects established within the Initial Forestry Project areas near Lake Lagunitas and Bon Tempe treatment plant.

Preliminary results of the monitoring indicate the District's Forestry Work is not impacting abundance or richness of native understory plants in the first two years post treatment. There is good regeneration of tree species not vulnerable to Sudden Oak Death, especially madrone. The District will continue to monitor the sites.

Forest Fuel Maintenance

Ongoing maintenance of areas where fuels and brush density were reduced and where trees were planted is necessary to improve overall forest stand structure. Maintenance of existing Resilient Forest sites promotes long-term ecosystem resilience and function.

FY25 Forest Fuel Maintenance Sites:

- South Potrero Meadow

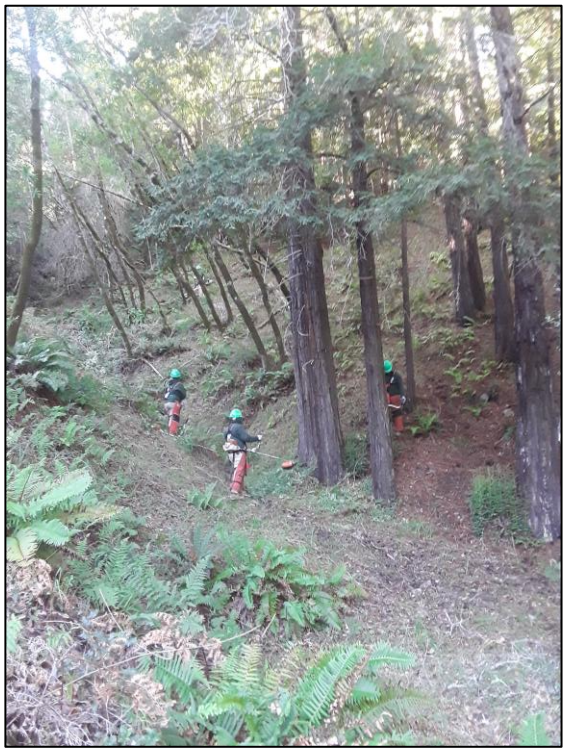
- East Potrero meadow
- Lake Lagunitas
- Above Filter Plant
- Rock Springs
- West Meadow Club

Outcome	Approximate Cost
115 Acres	$339,799

Pile Burn Operations are included in Forest Maintenance acreage when those piles are located in Forests away from Fuelbreaks or Defensible Space. In FY25 75 of the total 143 acres of Forestry Maintenance consisted of pile burns, where the District and Contractors burned an estimated 3,100 piles.

Of the $482K used for Forest Maintenance, $480K was used specifically for pile burning with an approximate cost of $155 per pile, which is down from $192 per pile in FY24.

Photo 23: Pile Burn Operations along W. Ridgecrest Blvd.



The remaining $2K for Forest Maintenance was used to support grant funded forestry work. Specifically Conservation Corps North Bay used $358K in grant funds from a third party to treat resprouting woody vegetation on the Marin Watershed.

Photo 24: CCNB Grant Funded Forest Maintenance Treatments.

Prescribed Broadcast Burning in Forests

Broadcast burning is a specific activity in which fire is applied to most or all of a well-defined area with discrete boundaries for the combined purpose of fuel load reduction and habitat improvement

Broadcast burning helps to improve forest stand structure by suppressing the re-establishment of brush in the understory that competes with native trees and by stimulating seed germination of fire-dependent native species.

In FY25 the District completed one broadcast burn in forest land at the Mt Theater Unit totaling 1 acre. The burn was implemented by Marin County Fire under a plan drafted by Marin Water, and in coordination CA State Parks and neighboring fire agencies. Ultimately the burn was halted at 1 acre due to high fire intensity and fire creeping up into the canopy as shown in the photo to the right.

The District continues to monitor all fire effects and natural resource objectives related to fuel reduction and forest health.

Outcome	Cost
1 Acre	$12,408

Photo 25: Rx Fire at Mt Theater

Photos 26: Pre Ignition Briefing at the Mt Theater Rx Burn Site.

3.4 Improve Grassland and Oak Woodlands-MA 23

Reduce Encroachment in Oak Woodlands & Grasslands

In the absence of wildland fires, native Douglas fir trees invade oak woodland and grassland habitat on Mt. Tamalpais. On the watershed, both woodland and grassland habitats have significantly declined in area due to the encroachment of Douglas fir trees. Using a combination of hand crews and heavy equipment to remove young fir trees growing within grasslands and mixed hardwoods slows the rate that these plant communities are lost and retains the unique habitat and biodiversity that each provides.

Oak woodland and grassland preservation:

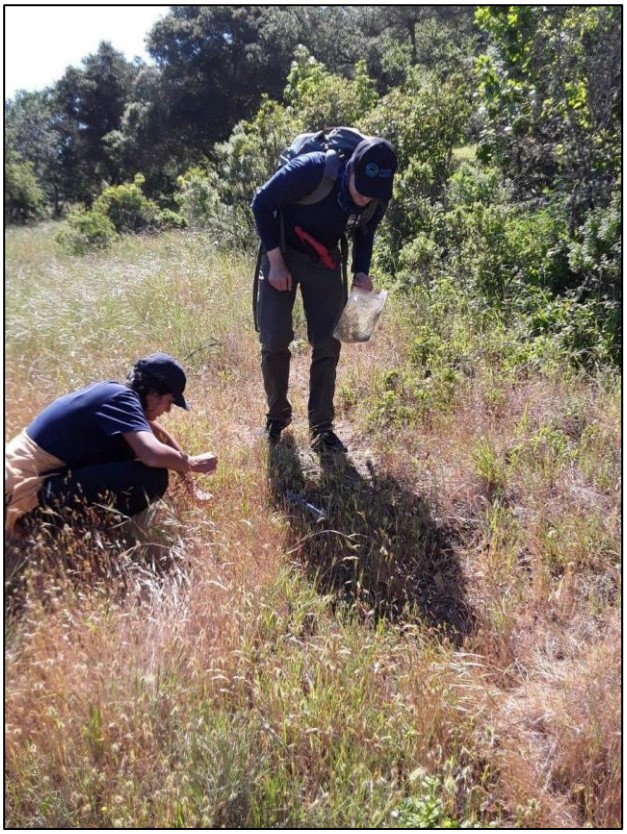
- Upper Lag Rock
- West Meadow Club
- Azalea Meadow Club
- Lower Lag Rock
- Bon Tempe Dam Rx Burn Unit (Prep)
- East Potrero Meadow

Outcome	Cost
199 Acres	$1,357,494

Phots 27 and 28: Upper Lag Rock Before/After sequence showing the reduction of Doug Fir and other invasive woody species.

Goatgrass Reduction

This species is targeted because of its ability to invade serpentine habitat – one of the least-invaded and rare plant-rich habitats on the Watershed. At present, barbed goatgrass is restricted to three known locations, and though one is large, it remains discrete enough to fully manage. Extirpating these populations benefits watershed biodiversity and reduces future management costs. The goatgrass infestation on district lands is centered on the intersection of Bolinas-Fairfax Road and Pine Mountain Road, though two additional populations were found within the last five years: one near Bullfrog Quarry and the other on San Geronimo Ridge. The target is to treat all infestation annually with a long-term target of extirpation of this species from the watershed.



Phots 29 & 30: Barbed goat grass (*Aegilops triuncialis)* removal near Pine Mt. Fire Rd.

Goat Grass Manually removed at priority sites:

- Azalea Hill
- Pine Mt. Fire Rd.
- Bullfrog Rd

Outcome	Cost
16 Acres	$8,000

In FY25 the District received an additional $10,780 in grant funded labor through Golden Gate National Parks Conservancy and Marin Dept. of Agriculture to assist with the removal of Goatgrass on Watershed land. This cost was not incurred directly by the District and is therefore not included in the tables above.

Yellow Starthistle Reduction

Yellow starthistle is second only to broom in the amount of the watershed that it has invaded. Eliminating this weed before it spreads further will benefit biodiversity and reduce future management costs. The district treats infested areas multiple times each year to achieve 25 percent reduction in percent cover at existing infested sites and the district will initiate treatment of incipient populations as detected. The target is to achieve containment at the 2015 extent of yellow starthistle and a 10% reduction in the level of effort needed to prevent seed set.

Phots 31 & 32: Yellow Starthistle (Centaurea solstitialis) removal near Rock Springs.

Yellow star thistle removed at priority sites:

- Deer Park
- Sky Oaks Meadow,
- Ridgecrest Blvd
- MVAFB
- Peters Dam
- Fawn Ridge
- Cataract Trail
- Rock Springs

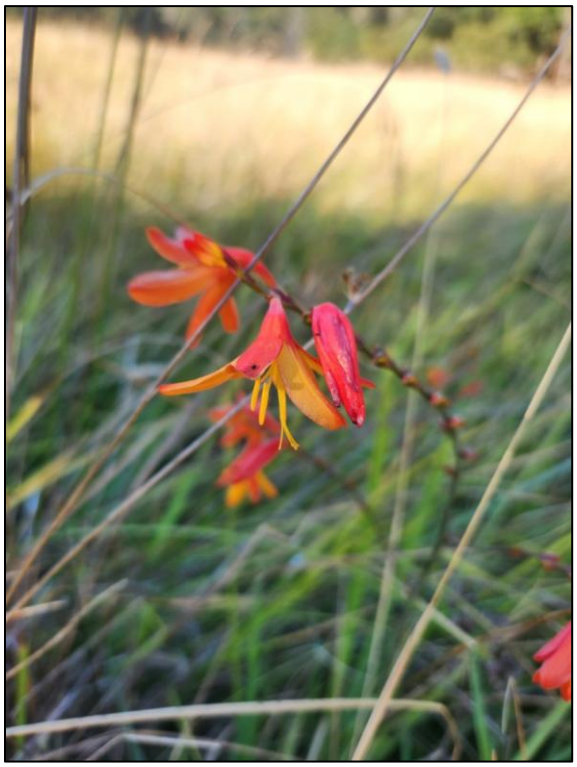
Outcome	Cost
129 Acres	$30,135

Control of Other Priority Weeds

Invasions of other high priority weeds are limited and generally are scattered throughout the watersheds. The species targeted are known or suspected to negatively impact rare plants or sensitive natural communities.

Priority weeds manually removed across the watershed with priority placed at:

- Yolanda Trail
- West Peak / Mill Valley Air Force Base
- Peters Dam
- Ridgecrest
- Rock Springs
- Cataract Trail



Photos 33 & 34: Monbretia (Crocosmia Xcrocosmiiflora) and foxglove (Digitalis purpurea) respectively.

Experimental Weed Treatment

Trial 1 - Acacia Peeling:

Blackwood acacia (*Acacia melanoxylon*) is an invasive tree that grows sporadically across the Watershed, the largest population being around Phoenix Lake. It is known for creating large clonal populations and root suckering when damaged, and thee seeds are adapted to sprout after a fire. This makes blackwood acacia a very real threat to the Watershed in the event of a fire because without the use of herbicide, there is no current method to permanently control these trees.

Peeling bark off of the tree from about three feet up to the ground has been demonstrated in other countries as an effective way to control blackwood acacia without the use of herbicide. Bark peeling removes the phloem and cambium of the tree leaving only the xylem, which effectively slowly starves the roots of the tree and removes adventitious buds within the bark and cambium.

Trees were peeled in the late winter and early spring of 2024 in three different locations. At one location where live blackwood acacia stumps were actively resprouting, tarps were used to solarize and smother any live stumps. In total, 14 blackwood acacia were peeled and 7 stumps were tarped for a total of 0.05 acres treated.

Treatments are monitored monthly. All individuals peeled are showing signs of stress such as yellowing leaves. 50% of treated individuals have resprouted, but are only producing sprouts from areas where the cambium could not be removed fully. Only one individual has managed to begin regrowing its cambium in the peeled area and only one resprout has been observed from the tarped stumps where the tarp was not layered enough. The weed trial will be considered successful if 70% of treated individuals are confirmed dead two years after treatment and if tarped stumps are dead three years after treatment when the tarps will be removed.

Outcome	Approximate Cost
Acacia Bark Peeling Monitoring Year 2 of 3	**$0**

Photos 35 & 36: Experimental Blackwood Acacia Treatments near the Sky Oaks Residence.

4 Compliance Verification and Monitoring in FY25

The district developed the BFFIP to plan the management of district lands to minimize fire hazards and maximize ecological health. The district prepared a Program EIR for the BFFIP in accordance with CEQA, which requires the implementation of mitigation measures to avoid or lessen the significant environmental impacts of the district's vegetation management activities. The Final Program EIR for the BFFIP was adopted in October of 2019. This section summarizes the district's fiscal year 2025 verification and monitoring activities conducted in compliance with the BFFIP EIR mitigation measure.

4.1 Requirements Implemented by Management Action

Mitigation compliance is tracked on a project-by-project basis. Projects fall within several Management Actions or MAs. The MAs with environmental compliance components include:

- MA-20: Perform cyclical maintenance throughout the infrastructure zone with sufficient frequency to maintain design standards.
- MA-21: Construct the remainder of the fuelbreak system
- MA-22: Expand EDRR to identify, report, and treat new populations of invasive species
- MA-23: Improve conifer and mixed hardwood forest stand structure and function in the ecosystem restoration zone
- MA-24: Improve grasslands and oak woodlands in the ecosystem restoration zone
- MA-25: Reintroduce or enhance historic populations of special-status plant species
- MA-26: Develop and implement 10-year restoration plans for Potrero Meadow, Sky Oaks Meadow, and Nicasio Island
- MA-27: Conduct experiments and trials to identify suitable methods for control of invasive species

The projects that were implemented under each management action and the mitigation measures that were implemented in fiscal year 2025 are summarized in Table 2.

Table 2 Management Actions, Projects, and Mitigation Measure Compliance

Management Action	Projects Completed under Management Action	Mitigation Measures Implemented	
All MAs with environmental compliance components		**See Appendix A**	
MA-20 Perform cyclical maintenance throughout the infrastructure zone with sufficient frequency to maintain design standards	• Fuelbreak maintenance and cutting of woody vegetation • Fine fuel mowing • Broom removal in fuelbreaks • Roadside mowing • Dam maintenance	• MM Air-3 • MM Air-4 • BMP-1	• MM Hazards-3 • MM Hydrology-1 • MM Noise-1
MA-21 Construct the remainder of the fuelbreak system	• New fuelbreak construction	• MM Air-3 • MM Air-4 • BMP-1 • BMP-5 • MM Biology-2 • MM Biology-11 • MM Biology-12 • MM Cultural-3	• MM Cultural-4 • MM Hazards-1 • MM Hazards-2 • MM Hazards-7 • MM Hydrology-1 • MM Noise-1 • MM Recreation-1 • MM Transportation-1
MA-22 Expand EDRR to identify, report, and treat new populations of invasive species	• Road, disturbed areas, and trail surveys • Control of small weed patches	• BMP-7 • MM Biology-2 • MM Biology-11 • MM Biology-12 • MM Biology-17 • MM Cultural-1 • MM Hazards-1	• MM Hazards-6 • MM Hazards-7 • MM Hydrology-1 • MM Noise-1 • MM Recreation-1 • MM Transportation-1

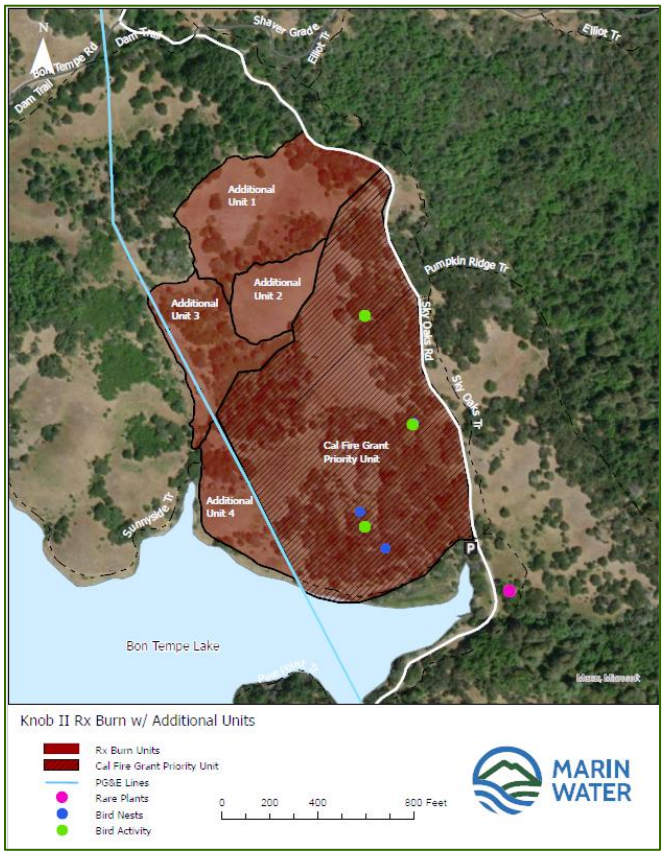
MA-23 Improve conifer and mixed hardwood forest stand structure and function in the ecosystem restoration zone	• Initial forest fuel reduction • Forest fuel maintenance	• MM Air-1 • MM Air-3 • MM Air-4 • BMP-1 • BMP-4 • BMP-5 • BMP-6 • BMP-7 • MM Biology-2 • MM Biology-17 • MM Cultural-1 • MM Cultural-3	• MM Cultural-4 • MM Geology-2 • MM Hazards-1 • MM Hazards-2 • MM Hazards-3 • MM Hazards-4 • MM Hazards-5 • MM Hazards-7 • MM Hydrology-1 • MM Noise-1 • MM Recreation-1 • MM Transportation-1
MA-24 Improve oak woodlands and grasslands (OW&G) in the ecosystem restoration zone	• Douglas fir thinning in OW&G • Maintenance of Douglas fir • Broom removal in OW&G • Broom maintenance in OW&G • Goatgrass reduction in OW&G • Yellow star thistle management in OW&G • Control of other priority weeds in OW&G	• MM Air-1 • MM Air-3 • MM Air-4 • BMP-1 • BMP-4 • BMP-5 • BMP-6 • BMP-7 • MM Biology-2 • MM Biology-11 • MM Biology-12 • MM Biology-17 • MM Cultural-1	• MM Cultural-3 • MM Cultural-4 • MM Geology-2 • MM Hazards-1 • MM Hazards-2 • MM Hazards-3 • MM Hazards-4 • MM Hazards-5 • MM Hazards-7 • MM Hydrology-1 • MM Noise-1 • MM Recreation-1 • MM Transportation-1

4.2 Compliance and Monitoring Considerations and Findings

The district was able to effectively carry out the BFFIP mitigation measures for all Management Actions completed through the use of technical staff, partner agencies and professional environmental consultants. The district has integrated new mapping technologies to help identify avoidance zones within project sites which help guide field activities. The Knob II Rx Burn Compliance Map shown below was used to avoid disturbance to sensitive areas within the burn area.

The overall level of effort to carry out BFFIP compliance is significant and requires professionals with specific technical expertise. As the district scales up implementation of vegetation management under the BFFIP compliance costs will increase due to the need for additional compliance surveys. The compliance work is critical to ensuring that the district can effectively avoid sensitive cultural and natural resources and protects the biodiversity of the district's watershed lands while reducing wildfire hazards. The number of total hours spent completing pre project surveys will increase in subsequent years as the acres of implementation increase.

The district carries out compliance trainings with contractors working on the watershed before work is initiated.



Map 3: Compliance Map for the Knob II Rx Burn Site.

5 BFFIP Review & Work Plan

5.1 Review of BFFIP Management Actions

As part of implementing the BFFIP the district conducts an annual review of project activities. As the district continues to scale up work to reduce the risk of wildfire, preserve and enhance important biological resources and ecosystem functions, the district will review and revise its work in response to changing conditions.

The below table compares BFFIP Year 6 Thresholds to actual completed work for FY 2025, and outlines BFFIP Targets for Year 7.

Management Actions	Year 6 Thresholds	Year 6 Completed	Year 7 Thresholds
MA-20.1 Maintain existing fuel breaks	200 acres	200 Acres	200 acres
MA-20.2 Mow fine fuels	50 acres	47 Acres	50 acres
MA-20.3 Broom Work*	765 acres	590 Acres	765 acres
MA-20.4 Roadside mowing	50 acres	51 Acres	50 acres
MA-20.5 Dam maintenance	50 acres	43 Acres	50 acres
MA-21 New fuelbreak construction	15 acres	6 Acres	10 acres
MA 22.1 EDRR surveys	150 miles	20 miles	150 miles
MA 22.2 EDRR weed treatments	100 patches	73 patches	100 patches
MA 23.1 Forest fuel reduction**	100 acres	9 Acres	100 acres
MA 23.2 Forest maintenance**	300 acres	143 Acres	300 acres
MA 23.3 Forest Rx burn	2 Rx units	1 Unit	2 Rx units
MA 24.1 Douglas fir thinning	200 acres	193 Acres	200 acres
MA 24.2 Oak & grassland Rx burn	3 units	0 Units	3 units
MA 24.5 Goatgrass removal	35 Acres	16 Acres	35 Acres
MA 24.6 Yellow star removal	120 Acres	129 Acres	120 Acres
MA 24.7 Priority weeds	-- acres	88 acres	-- acres
MA 25.1 Planting	3 projects	0 project	3 projects
MA 25.2 Habitat restoration	3 projects	3 projects	3 projects
MA 27 Weed control trials	3 project	1 project	3 projects

*In Year 5 the three Broom related MAs 20.3, 24.3, & 24.4 were be combined as a single Management Action.

**In Year 5 MAs 23.1 & 23.2 were increased above originally approved thresholds as part of the BFFIP Addendum.

For FY25 the district met the many of the acre thresholds for BFFIP year six, but experienced a shortfall in Broom Work, New Fuelbreak Construction, and Initial Forest Fuel Reduction. The shortfall in Broom in FY25 was the result of a higher ratio of new broom work to broom maintenance. New broom work is typically 5x – 10x slower than maintaining an existing site. Broom sites are maintained every other year, and the current cycle of maintenance resulted in most of the existing sites being maintained in FY24, with another big year anticipated for FY26.

The District completed just 6 acres of new fuelbreak construction in FY25 due primarily to complexity of the Fern Tank Site. Veg type and timing both resulted in slower than anticipated progress at that site. Specifically cutting fuelbreak through hard Chapparal species is much slower than for example a conifer forest. Additionally that work occurred mostly in Spring during bird nest season, so the constantly changing nest survey perimeters and nesting buffers slowed work. This slower than anticipated progress is offset by all the chipping work performed at Fern Tank. All biomass at the Fern Tank site has been chipped and disposed of, and won't require a follow up pile burn or mastication treatment.

Initial Forest Fuel Reduction work fell short in FY25 because of a delay in execution of a vegetation contract. Contract # 2034, which provides for mastication services was executed in late October 2024, roughly 3 months later than expected, which reduced allowable time to perform the needed work.

The actual treated acres of Goatgrass will vary from year to year based on the efficacy of ongoing treatments. Annual variations in Yellow Starthistle treatments MA 24.6 are directly related to seasonality of the plant and whether the treatment window falls in June or July (i.e. Prior vs Current FY) of each season.

In FY25 the district treated 1,585 acres for $3,635,114 for an average cost of $2,293 / acre compared to $1,908/acre in FY24. After including $386,540 in compliance costs the total cost increased to $4,021,654 with a per acre cost of $2,536/acre. As a percentage of total costs, compliance costs were 9.6% of the total. Costs referenced in this report reflect direct costs for vegetation work only, and do not include administrative support, planning, contract negotiation, etc.

FY25 Total BFFIP expenses were partially funded with $1,130,428 in direct grant funding provided by the California Wildlife Conservation Board. Additionally, in FY25 the district received $368,799 worth of 3rd party grant funded labor hours. These 3rd party grant funds went directly to the contractor performing the work and did not pass through Marin Water. The labor however benefit the District. Direct Grant Funding plus 3rd party grant funded labor comprised approximately 34% of the total FY25 BFFIP Expense.

The below table summaries cost per acre for vegetation management activities completed during FY25.

Cost per Acre by Management Action		
Management Action	**Description**	**Cost/Acre**
MA-8	Coordination with PG&E	$54
MA-9	Coordination with Lessees	$573
MA-20.1	Maintain fuelbreaks	$1,429
MA-20.2	Mow fine fuels	$342
MA-20.3	Remove broom from fuelbreaks*	$1,614
MA-20.4	Roadside mowing (non-break)	$1,798
MA-20.5	Dam maintenance	$1,210

MA-21	Construct new fuelbreak	$40,023
MA-23.1	Initial Forest Fuel Reduction	$6,450
MA-23.2	Maintenance of forest fuels	$3,379
MA-23.3	Prescribed Burning in Forests	$12,213
MA-24.1	Reduce fir encroachment in grasslands and oak woodlands	$7,022
MA-24.2	Prescribed Burning in Oaks Woodlands and Grasslands	n/a
MA-24.5	Reduce goatgrass	$493
MA-24.6	Reduce yellow starthistle	$234
MA-24.7	Control Other Priority Weeds	$511
MA-27	Experimental Weed Treatment*	n/a
Total Vegetation Treatment Costs / Acre		$2,293
Total Compliance Costs		$386,540
Combined Veg & Compliance Cost / Acre		$2,536

5.2 Work Plan for Fiscal Year 2026 (BFFIP Year 7)

The district conducts year end reviews of BFFIP activities to inform project planning for the following year. For year six of BFFIP implementation the district will rely on newly secured grant funds from The Wildlife Conservation Board and CalFire. These funds will be allocated over a 3 to 4 year period to help meet the BFFIP targets and goals of reducing wildfire fuels while enhancing biodiversity and ecosystem function. Below is a brief summary of BFFIP priorities for year seven.

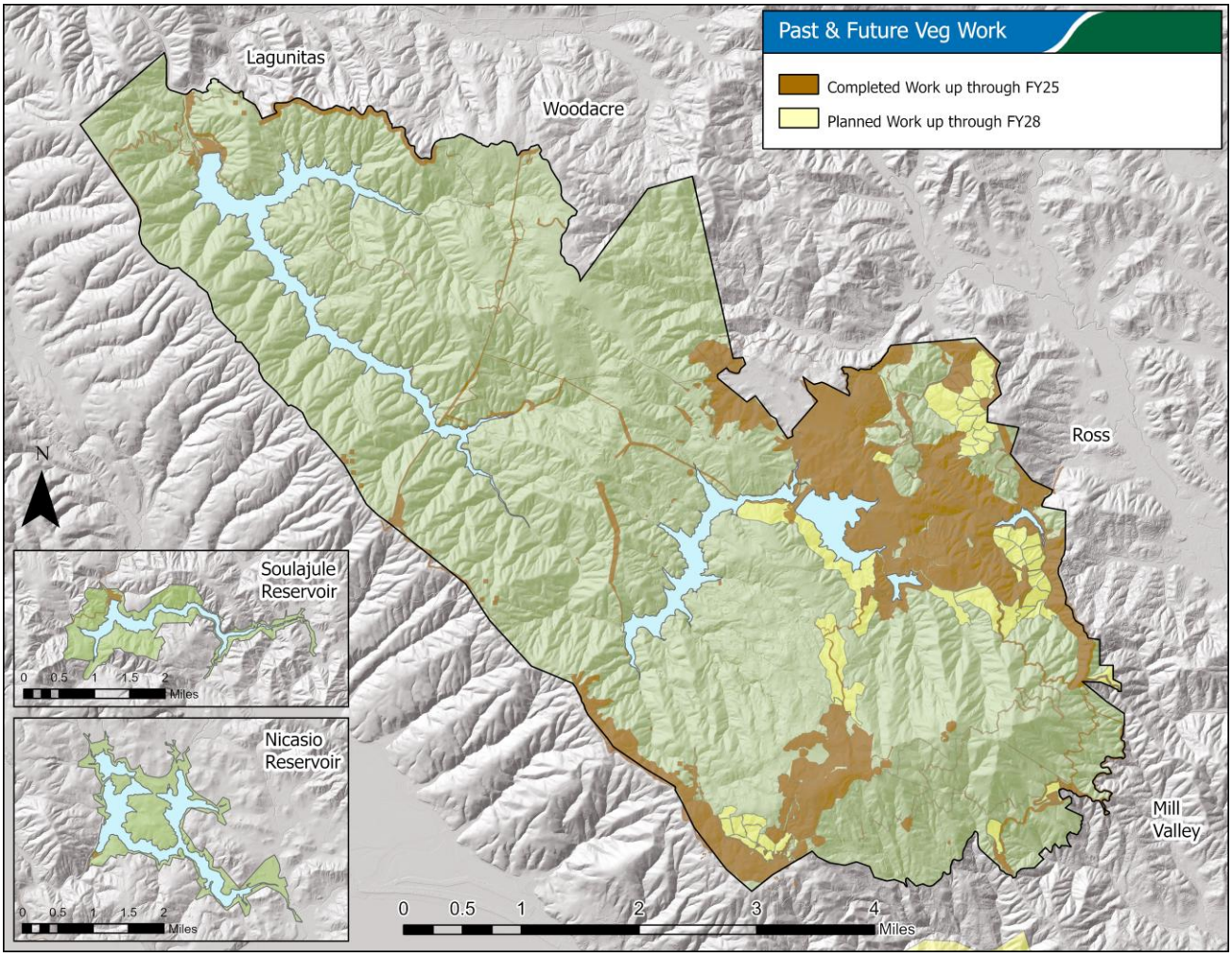
Planning and Monitoring

- Continue collaborating with One Tam on implementing the Regional Forest Health Strategy.
- Collaborate with Marin Wildfire Prevention Authority on the Technical Advisory Committee.
- Continue to monitor vegetation responses to BFFIP forestry treatments
- Continue mapping and treating non-native invasive plants.
- Continue to develop forestry restoration outreach materials to educate watershed users of the multi-benefit forestry restoration work underway.
- Continue Prescribed fire planning with MCF and BAAQMD, as well as with FIGR for additional cultural resource surveys.

Vegetation Management

- Complete BFFIP Year 7 vegetation management plan.
- Collaborate directly with MWPA Vegetation crews to treat portions of the Greater Ross Valley Shaded Fuelbreak that extend into the Marin Watershed.
- Expand the Blithedale Fuelbreak by approximately 17 acres.
- Complete remaining acres of forest restoration work around Rock Springs as part of the WCB and Cal Fire Forest Health Grants.
- Collaborate with Marin County Fire to conduct Prescribed Broadcast Burns across the Watershed.
- Focus new Broom work around Worn Springs and Fish Grade.
- Continue removal of invasive weeds.

Map 4: Completed vs Planned Work



6 Appendices

Appendix A – Mitigation Measures List

The following mitigation measures were implemented for all Management Actions (MAs) with environmental compliance components (MA-20 to MA-27):

- MM Air-2 (Asbestos)
- MM Air-3 (Air Pollutants)
- MM Air-4 (Smoke)
- BMP-1 (Operations)
- BMP-2 (Pre-work Assessment/Planning
- BMP-3 (Import fills, rock & plants)
- MM Hazards-1 (Spills)
- MM Hazards-3 (Fire Risk)
- MM Hazards-4 (Prescribed Burn Plan)
- MM Hazards-7 (Fire Ignition)
- MM Hydrology-1 (Water Quality)
- MM Noise-1 (Noise Reduction)
- MM Recreation-1 (Roads & Trails)
- MM Transportation-1 (Emergency Access)
- MM Biology-1 (Worker Training)
- MM Biology-2 (Special-Status Plants)
- MM Biology-3 (Invasive Species)
- MM Biology-4 (Forest Diseases)
- MM Biology-5 (Roosting Bats)
- MM Biology-6 (Badgers)
- MM Biology-7 (Nesting Birds)
- MM Biology-8 (Northern Spotted Owl; nesting season)
- MM Biology-9 (Western Pond Turtles)
- MM Biology-10 (CA Red-Legged Frog)
- MM Biology-12 (Foot-Hill Yellow Legged Frog)
- MM Biology-13 (Mollusks)
- MM Biology-14 (Northern Spotted Owl, avoidance buffer)
- MM Biology-15 (Wetlands)
- MM Biology-16 (Native Grasslands)
- MM Cultural-2 (Cultural Resources)
- MM Geology-1 (Erosion Control)

Appendix B – Pathways Fuel Model – Executive Summary

Marin Municipal Water District

Fire Pathways Analysis

Prepared For
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WILLOW

Executive Summary and Key Findings

This modeling study uses fire pathways analysis to identify the portions of the Marin Water Mount Tamalpais Watershed where fire could spread rapidly toward adjacent communities or Marin Water infrastructure. Using a fuels dataset representative of conditions in Marin County circa 2019, it first evaluates baseline fire spread on the watershed and characterizes areas where rapid fire spread towards values at risk was likely before the implementation of recent vegetation management initiatives by Marin Water. Subsequently, using a heuristic-based fuel conversion crosswalk to reflect the impact of vegetation management on surface and canopy fuels, it evaluates the role of recent Marin Water vegetation management projects on interrupting those pathways and slowing fire growth in strategic locations (Phase I) and the projected marginal impacts of the additional vegetation management planned to occur on the Watershed between 2025 and 2030 (Phase II).

Fire pathways: Fire pathways are the paths of least resistance across the landscape - where fuels, terrain, and wind align to produce rapid fire growth towards a community or an asset important to community wellbeing. This modeling approach, which relies on the same underlying fire physics and mathematics as other contemporary fire behavior modeling in the United States, is useful for identifying areas of a landscape where fire runs are possible and for determining the communities and key infrastructure with the greatest vulnerability to fast-moving wildfires. The approach is based on peer-reviewed scientific literature and can complement other wildfire risk assessments, such as those that characterize flame length and fire probability.

Fire Weather Scenarios: This study creates fire pathways for eight communities (Mill Valley, Larkspur, Kentfield, Ross, Fairfax, Woodacre, Lagunitas, and Stinson Beach) under two fire weather scenarios. The Diablo scenario represents Marin's most common fire weather scenario: strong, dry winds from the northeast. The west wind scenario represents a post-Diablo event wind reversal, when the dry air mass over the Pacific Ocean is pushed back onshore, potentially driving fire growth from the opposite direction.

Representing Fuel Treatments: Guided by the 2019 Biodiversity, Fire, and Fuels Integrated Plan, treatments on Marin Water lands are designed to have multiple ecological, water quality, forest health, and wildfire risk benefits. This study represents planned and completed vegetation management activities using a crosswalk developed by Marin Water fire behavior consultants during previous wildfire risk assessment studies. The crosswalk maps pre-treatment vegetation characteristics to post-treatment alternatives (e.g., Very High Load Broadleaf Litter fuels to Moderate Load Broadleaf Litter fuels) based on site-specific factors. This approach enables the comparison of fire behavior before and after treatment implementation. While there are known limitations in both the underlying "baseline" dataset (produced as part of the Marin County 2020 Community Wildfire Protection Plan) and the heuristic-based crosswalking logic, fire behavior modeled using this approach is generally representative of the behavior expected by fire professionals in Marin County.

Phase I: Treatments Completed between 2020 and 2024

This study finds that the recent (2020-2024) multi-benefit vegetation management projects have been highly successful at limiting fire growth towards Marin Water assets central portion of the Mount Tamalpais Watershed and to adjacent southern and central Marin communities. There are opportunities for additional vegetation management in the northern and western portions of the Watershed to further mitigate the risk of fast-moving fires to infrastructure and adjacent communities in these areas.

Impacts to Southern Marin: This study finds a substantial risk of rapid-fire growth along the southern portions of Mount Tamalpais. Under a westerly wind, fire is projected to spread moderately quickly into developed portions of Mill Valley and Kentfield, moving up to 0.3 mph in the native shrub and grass vegetation. Under a Diablo Wind, these fire growth corridors may facilitate very rapid fire spread from south-central Marin communities (e.g., an ignition in Kentfield or Mill Valley) all the way to the community of Stinson Beach, reaching and exceeding 1.5 mph in some locations. Several recent Marin Water vegetation management projects have occurred along this corridor, effectively mitigating the risk of fast-moving fire spreading into communities under either fire weather scenario. These projects include the Indian Crown project, the Ridgecrest RX projects, and the Hoo-Koo-E-Koo and Railroad Grade fire road clearance projects.

Impacts to Central Marin: This study projects that the redwood forests and bay woodlands that occupy much of the eastern portion of the watershed are unlikely to produce rapid fire spread towards most of Kentfield or Ross. While fire may burn through this vegetation, it is projected to do so more slowly than in other vegetation types. Therefore, the numerous Marin Water treatments in the eastern portion of the Watershed are not projected to substantially alter the exposure of these adjacent communities to fast-moving fire. However, these vegetation management initiatives, including the Knob, YOSH, and Sky Oaks projects, dramatically lower the likelihood that the Marin Water facilities and assets, including the Bon Tempe Treatment Plant, will be exposed to rapidly moving fire along a fire pathway; these projects are projected to increase arrival time to these assets by six hours or more. Additionally, these projects are anticipated to lower the likelihood of a fire initiated in Kentfield or Ross becoming established and burning rapidly onto the watershed, reducing the likelihood that Marin Water assets will be exposed to fast-moving fire during a Diablo wind event.

Impacts to the San Geronimo Valley: Rapid fire growth off the northern section of the Watershed may impact the communities of Fairfax and Woodacre under a west wind event. Lighter fuels (grasslands and native shrub alliances) in the ridgetop areas in the northern sections of the watershed are projected to produce very rapid fire spread over Happersberger Point and Pine Mountain Ridge (1.2-1.5 mph) and into the adjacent open space lands. These pathways may impact downwind communities and the San Geronimo Treatment Plant, an important node in Marin Water's distribution network. Under a Diablo wind event, fire is likely to grow rapidly into this area of the watershed following similar pathways; however, because there are few Marin Water assets in this portion of the Watershed and because Kent Lake serves as an effective fire break, damage

potential and community impact are limited. The effect of recent vegetation management projects in this area is minimal.

Impacts to Stinson Beach: Fire pathways under a northeast wind event project that fire coming off the Watershed could impact the community of Stinson Beach. Grassy fuels in alignment with unsheltered ridgetop winds at the top of the Bolinas Ridge may exceed 1.2 mph. Although vegetation management has occurred in the southwestern portion of the watershed, that work is not projected to substantially impact the fire's arrival at Stinson Beach.

Phase II: Planned Future Treatments

The additional Phase II treatment units are anticipated to provide moderate marginal utility in reducing the threat of fast-moving fire to communities and the Marin Water infrastructure adjacent to the Watershed. Because Phase I treatments are projected to be highly beneficial at reducing the threat of fast-moving fire on the Mount Tamalpais Watershed, relatively little residual threat remains after the completion of the Phase I projects. Phase II projects are anticipated to be most effective at reducing the consequences of a fire originating in the surrounding communities burning onto the Watershed, affecting Marin Water lands and infrastructure during high-severity fire weather conditions.

Projected Impacts to Southern Marin: The Phase II treatment acres are projected to be moderately effective at reducing the consequences of a fire burning off Mount Tamalpais into the community of Mill Valley, affecting the community and Marin Water infrastructure in the vicinity of the Fern Canyon Pump Station. With the implementation of the Phase II projects and the treatments performed by other Marin land and fire management agencies, the likelihood of a fast-moving fire moving into or out of the watershed in Southern Marin is low. Several slight adjustments to project boundaries could further reduce this threat by treating residual high rate of spread fuels.

Impacts to Central Marin: The extensive network of treatments implemented in the Bon Tempe area of the watershed between 2020 and 2024 greatly lowers the threat of a fast-moving wildfire burning off the watershed into the communities of Ross and Kentfield. The additional Phase II projects are projected to provide relatively little additional change in fire arrival time at these communities or adjacent Marin Water pumping infrastructure. However, the additional treatments units, including the treatment of Bald Hill and the projects around Pilot Knob, reduce the fuel continuity and potential consequence to the Watershed and Water infrastructure of a fire originating in the Central Marin communities during a northeast wind event. In this scenario, arrival time at the Bon Tempe facilities is increased by five hours or more and the modeled fire size within the 24 hours is anticipated to be significantly smaller, reducing the impact to the central Watershed.

Projected Impacts to San Geronimo Valley: With very few treatments planned in the northern half of the Watershed, there is projected to be little to no change in fire threat to the communities of Fairfax, Woodacre, and Lagunitas as a result of the 2025-2030 treatment plan. A slight change

in treatment footprint along the Fairfax-Bolinas Road could benefit the western portions of Fairfax.

Projected Impacts to Stinson Beach: Phase II treatments are well located to mitigate threats to Stinson Beach; however, significant residual risk is projected after the treatment of these areas. Fire originating on the Watershed is projected to burn over the Bolinas Ridge into the community during severe fire weather. Although the Phase I and Phase II treatments along Ridgecrest Blvd are positioned to interrupt this threat, a significant residual threat remains after treatment due to the very high ridgetop winds and the light fuels in this area. Alternative treatment strategies are recommended in this area.

Recommendations for Future Treatments

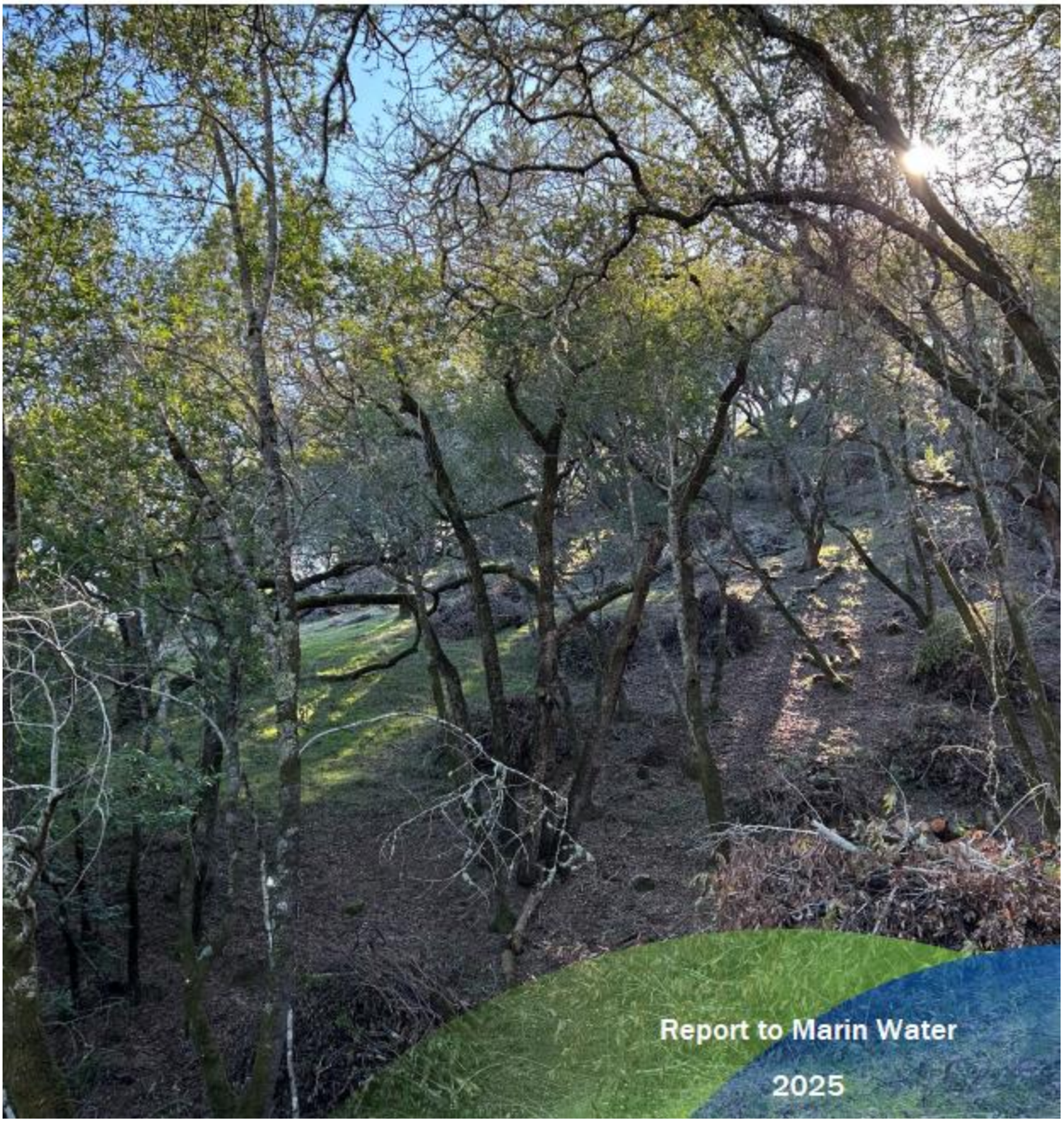
Collaborative Treatments: While Marin Water's recent and proposed treatment projects are projected to have been broadly effective at reducing the risk of rapid fire spread, collaborative efforts to plan projects that span land management boundaries may effectively mitigate the residual pathways remaining after Marin Water's treatments. Boundary-spanning projects with Marin County Parks and Open Space and California State Parks could yield significant benefits by preventing fire from growing around single-agency projects and limit their effectiveness.

Geometry Adjustments: This analysis identifies several opportunities for slight adjustments to Phase II project boundaries that could improve risk reduction and minimize residual fire pathways.

Appendix C – Bird Response to BFFIP Treatments – Executive Summary

Point Blue

Bird response to vegetation management actions of Marin Water's Biodiversity, Fire, and Fuels Integrated Plan



EXECUTIVE SUMMARY

Ecosystem management involves understanding the variability across a landscape and how species respond to changes within it. The landscape of Marin County has changed over the past 150 years due to factors like disease (e.g., Sudden Oak Death), the spread of invasive species, and a reduction in the frequency and acreage of fire. These altered habitats can increase the risk of larger and more severe fires. Marin Water's Biodiversity, Fire, and Fuels Integrated Plan (BFFIP) aims to minimize risks from wildfire, preserve and enhance significant biological resources, and provide an adaptive framework for periodic review and revision. The vegetation management actions outlined in the BFFIP have the potential to influence biodiversity on Marin Water lands, and it is important to understand these impacts.

In this study, we evaluated short-term landscape-scale changes in the breeding landbird community on Marin Water lands that are attributable to nearby treatment actions prescribed by the BFFIP. We used point count data from a long-term monitoring program to analyze metrics of the bird community (overall bird abundance and species richness for 52 species, and individual species abundance for 27 focal species within 50 m of each bird survey point), before BFFIP establishment (2019) and after (2022) in control areas with no vegetation management as compared to areas with one of 4 major vegetation treatment categories: 1) Non-native Understory Removal, 2) General Understory Removal, 3) Douglas Fir Thinning, and 4) Mixed Layer Fuels Reduction. Because the treated proportion of the area within 50 m of each bird survey point was less than 100%, the results of our analysis represent evidence for a significant difference in the bird community in response to the mean treatment extent, which varied by treatment (range of means 18-72%). We analyzed data in a Bayesian framework, which allowed us to evaluate the probability of a positive or negative effect and distinguish a lack of effect from an uncertain response.

We found no evidence of significant negative effects of any of the 4 treatment categories on community abundance or species richness between 2019 and 2022, and no evidence of a widespread negative response by the bird community across the study area since BFFIP was implemented. Instead, our results suggest neutral or possible positive responses of overall bird community abundance and species richness to the treatment categories we analyzed. Specifically, we found possible positive responses of species richness to Douglas Fir Thinning and Mixed Layer Fuels Reduction, no large effect on community abundance of Mixed Layer Fuels Reduction, and no large effect of the Non-native and General Understory Removal treatments on either community metric, despite having sufficient precision to detect a large effect.

The responses of individual species were complex and varied among treatments and habitat guilds. We detected more positive individual species responses to Douglas Fir Thinning than negative responses, a relatively even split of positive and negative responses across species for the Non-native Understory Removal and Mixed Layer Fuels treatment categories, and more negative than positive responses to the General Understory Removal treatment category. By

habitat guild, we detected more positive responses for species affiliated with conifer/mixed hardwood habitat and species affiliated with multiple forest types, and more negative responses to treatments for species associated with oak woodland or scrub/chaparral habitats. However, due to limited sample sizes, our results were uncertain for many individual species' response to each treatment, and of the 12 species for which we were able to estimate a response to more than one treatment category, 7 (58%) had opposing responses to different treatments.

Although short-term, our results provide the first insights into the effects of BFFIP treatments on the breeding landbird community, as well as, to our knowledge, the first insights into effects of forest health and fuels management treatments on birds in Marin County. In this report, we document the details of the methods and results of this study and make recommendations for future research and management, especially evaluation over a longer time frame. As efforts continue across California to reduce fuels and the risk of catastrophic wildfires, it is important to evaluate how species respond to different treatments, so that land managers can adapt as we increase our understanding of these relationships. This study represents an important initial step toward that understanding for Marin County.