

# **FINAL PROGRAM ENVIRONMENTAL IMPACT REPORT**

## **MT. TAMALPAIS WATERSHED ROAD AND TRAIL MANAGEMENT PLAN**

**SCH No. 2004082018**

**April 2005**

**Prepared for: Marin Municipal Water District  
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## **PROJECT DESCRIPTION**

The Marin Municipal Water District (MMWD) proposes to adopt and implement the *Draft Mt. Tamalpais Watershed Road and Trail Management Plan* (Draft Plan). The Draft Plan identifies specific improvements for roads and trails on the Mt. Tamalpais Watershed to reduce erosion from those roads and trails. The Draft Plan identifies Best Management Practices and Environmental Protection Measures to be used when conducting the erosion control projects and for future management of the roads and trails. The Draft Plan also contains an inventory of all roads and trails and makes recommendations about accepting certain roads and trails as official roads and trails, reclassifying other roads and trails, and closing or decommissioning certain roads and trails.

## **EIR PROCESS AND FEIR FORMAT**

A Draft Environmental Impact Report was prepared for the project and circulated for public review in February 2005. The public review period began on February 2, 2005 and ended on March 17, 2005.

This document plus the Draft EIR become the Final EIR for the proposed plan. This Final EIR must be reviewed by the MMWD Board of Directors and certified as being legally adequate (per CEQA) by the Board of Directors prior to the Board taking action on the plan.

## **COMMENTS ON THE DEIR**

No written comments on the Draft EIR were submitted by any federal, state, or local agency or department or any private organization or member of the public.

On February 17, 2005, MMWD held a public hearing to take verbal comments on the Draft EIR. Three members of the public attended the meeting in addition to MMWD staff and MMWD's consultants. One member of the public, Larry Minikes made the following two comments.

1. What are the first Draft Plan projects that MMWD will implement?

*Response;* MMWD staff responded that the first major projects would be to replace culverts on Railroad Grade in Redwood Creek watershed in 2005 and decommission unneeded roads downstream of Peters Dam in 2006. Subsequent projects would concentrate on projects that reduce sedimentation to streams flowing off the Watershed.

2. MMWD should post information about proposed projects affecting trails and roads prior to the start of construction.

*Response:* MMWD staff responded that they plan to post such information on its website.

Given that there were no comments received that questioned the analyses or conclusions of the Draft EIR, no changes will need to be made to that document.

# **DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT**

## **MT. TAMALPAIS WATERSHED ROAD AND TRAIL MANAGEMENT PLAN**

**January 2005**

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## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 Introduction Chapter	1
1.1 Purpose of the EIR	1
1.2 Scope of the EIR	1
1.3 Contents of the EIR	2
1.4 Public Review and Comment	4
1.5 Project Location and Setting	5
1.6 Proposed Project Description	6
1.7 Project Review and Required Approvals	14
2.0 Summary Chapter	19
2.1 Summary of Project	19
2.2 Major Conclusions	19
2.3 Areas of Controversy	23
2.4 Summary of Project Alternatives Analysis	24
2.5 Impact and Mitigation Measure Summary Table	25
3.0 Environmental Impact Analysis Chapter	44
3.1 Hydrology and Water Quality	45
3.2 Vegetation	77
3.3 Wildlife	115
3.4 Other Resources	143
4.0 Topical Issues and Impact Summaries Chapter	148
4.1 Growth-Inducing Impacts	148
4.2 Cumulative Impacts	148
4.3 Significant Irreversible Environmental Changes	154
4.4 Project Alternatives	154
5.0 Appendix	Following Chapter 4
A. CEQA Data	
Bibliography	End of Report
Persons Contacted	End of Report
Report Preparers	End of Report

## TABLE OF FIGURES

<b>Figure</b>	<b>Following Page</b>
1. Regional Location Map	6
2. Watershed Map	6
3. Trail and Road Erosion Sites Targeted for Repair	6
4. Characteristics of Storm-Proofed Roads	8
5. Trail and Erosion Sites at Stream Crossings	8
6. Road and Trail System Changes	12
7. Watershed Affected by Lands Managed by the Marin Municipal Water District	45
8. Sub-Watersheds in the District Ownership and Their Acreages	46
9. General Vegetation Map	79
10. Special Status Plants	91
11. Special Status Plants	91
12. Special Status Plants	91
13. Special Status Plants	91
14. Spotted Owl Territories	121
15. Surveyed Western Pond Turtle Habitats	125
16. Red-legged Frog Critical Habitat	125
17. Drainages Surveyed for Yellow-legged Frogs	127
18. Cultural Resource Sensitivity	145

## Table of Tables

<b>Table</b>	<b>Page</b>
1. Impact and Mitigation Measure Summary Table	26
2. Sedimentation Potential	50
3. Recommended Treatments Along Inventoried Road	55
4. Recommended Treatments Along Trails	56
5. Special Status Species of Plants with Potential to Occur on the Watershed	86

## 1.0 INTRODUCTION

# 1.0 INTRODUCTION CHAPTER

## 1.1 PURPOSE OF THE EIR

This Draft Program Environmental Impact Report (EIR) addresses the potential impacts of future projects that would be implemented by the Marin Municipal Water District (MMWD) if it adopts the *Draft Mt. Tamalpais Watershed Road and Trail Management Plan* (Draft Plan). The Draft Plan identifies specific improvements for roads and trails on the Mt. Tamalpais Watershed (the Watershed) to reduce erosion from those roads and trails. The Draft Plan identifies Best Management Practices and Environmental Protection Measures to be used when conducting the erosion control projects and for future management of the roads and trails. The Draft Plan also contains an inventory of all roads and trails and makes recommendations about accepting certain roads and trails as official roads and trails, reclassifying other roads and trails, and closing or decommissioning certain roads and trails. This EIR identifies and assesses potentially significant environmental impacts that would or may result from this Draft Plan.

This EIR has been prepared in conformance with the provisions of the *California Environmental Quality Act (CEQA) Guidelines* as amended to date. CEQA requires that public agencies prepare and certify an EIR before carrying out projects that may have significant effects on the environment (Public Resources Code Section 21080). Preparation of an EIR is the responsibility of the "lead agency," the public agency that has the principal responsibility for carrying out or approving the project (Public Resources Code, Section 21067). Because MMWD is the agency that would approve and adopt the Draft Plan, it is the lead agency for the project.

The EIR has been prepared under contract to MMWD. This EIR is an informational document that is intended to inform MMWD (the Lead Agency), other public agency decisionmakers, and the public of the significant environmental effects of the proposed project and alternatives to the proposed project. MMWD will consider the information in this EIR along with other information presented during the decisionmaking process when determining whether to adopt or modify the proposed project or an alternative. The information contained in this EIR does not control MMWD's ultimate decision on the project. If MMWD decides to approve the project, however, then MMWD must respond to each significant effect identified in the EIR by making findings under Section 15091 of the *CEQA Guidelines* and, if necessary, making a Statement of Overriding Consideration under Section 15093.

## 1.2 SCOPE OF THE EIR

This EIR is a Program EIR. It has been prepared pursuant to Section 15168 of the *CEQA Guidelines* which state:

*(a) General. A program EIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either:*



- (1) *Geographically,*
- (2) *As logical parts in the chain of contemplated actions,*
- (3) *In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or*
- (4) *As individual actions carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.*

The Draft Plan contains recommendations for repairing hundreds of individual sources of erosion on the trails and roads of the MMWD Mt. Tamalpais Watershed as well as recommendations for long-term road and trail maintenance and operations. These individual actions have been or will be prioritized and implemented over the next twenty years. This Program EIR identifies the range of impacts that are expected from the various types of projects and provides a palette of mitigation measures to be used depending on the type of project and the environmental situation existing at the location and at the time the project would occur. The EIR is not a site-specific assessment of the many future project sites. Though, in a few cases, site-specific environmental assessments have been conducted for some of the project sites, and, where this is the case, the particular sites may be addressed in this EIR.

At the time that MMWD proposes to implement specific projects included in the Draft Plan, it will conduct a CEQA review to determine whether the resources on the site, the impacts that could occur to those resources, and the mitigations needed to reduce those impacts to a less than significant level are sufficiently addressed in this EIR. If additional field surveys are needed for plants, animals, wetlands, or other resources, these surveys would be conducted as part of that subsequent CEQA review. If additional mitigations are needed or the mitigation measures included in this EIR need modification to address the site-specific and project-specific conditions, these mitigations will be identified at the time of that subsequent CEQA review. However, it is expected that for most projects, the mitigation measures and Best Management Practices (BMPs) recommended in this EIR would apply to the individual projects and that these measures would reduce all impacts to resources to a less than significant level.

### **1.3 CONTENTS OF THE EIR**

This section of the EIR includes a description of aspects of the CEQA process. While this information is not required in an EIR, the authors believe it aids the public in understanding what an EIR is meant to be and what information it must contain. In the past, EIRs varied considerably in scope and substance. A growing body of legal decisions has clarified what impacts are to be examined and how these impacts are to be judged. The discussion here outlines certain basic CEQA concepts.

This EIR addresses all the areas of potentially significant impact as well as other potential impact areas that CEQA requires an EIR to investigate. The environmental effects of the project are analyzed for each topic. The *CEQA Guidelines* define the effects of a project as

changes from the environmental setting (i.e., existing conditions) that are attributable to the project.

Section 15151 of the *CEQA Guidelines* specifies that "an EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure."

Amendments to the *CEQA Guidelines* (adopted in October 1998) re-emphasize the fact that the purpose of the EIR is "to compel governments to make decisions with environmental consequences in mind." Technical perfection is not necessary, but "adequacy, completeness, and a good-faith effort at full disclosure" are required. "CEQA requires that decisions be informed and balanced. It must not be subverted into an instrument for the oppression and delay of social, economic, or recreational development or advancement," (*CEQA Guidelines*, Section 15003, as amended).

## **A. Significant Effect**

In accordance with Section 15143 of the *CEQA Guidelines*, this EIR focuses on the significant effects on the environment. Discussion of each major topic includes criteria used to evaluate whether an environmental impact is significant or insignificant. As explained in Section 15002(g) of the *CEQA Guidelines*, a significant effect on the environment is defined as a substantial adverse change in the physical conditions which exist in the area affected by the proposed project.

The significance criteria for each topic have been developed based on the *CEQA Guidelines*, standard Marin County practice, and the consultants' experience. The *CEQA Guidelines* include standards for determining whether an impact meets thresholds of significance. This EIR lists the thresholds of significance for each area of impact and assesses whether the project's impacts exceed these thresholds. If the impact does not exceed the threshold or if the recommended mitigation measures reduce the impact below the thresholds, then the impact is considered to be less than significant.

## **B. Decision on Whether to Approve the Draft Plan**

The *CEQA Guidelines* provide that public agencies should not approve projects as proposed until all feasible means available (i.e., mitigation measures or alternatives to the project) have been employed to substantially decrease the significant effects of such projects. "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time taking into account economic, environmental, legal, social, and technological factors (*CEQA Guidelines*, Section 15364). A public agency can approve a project with unmitigated, significant impacts only if it finds that specific economic, legal, social, and/or technological factors make infeasible the mitigation measures or project alternatives identified in the Final EIR for the project (*CEQA Guidelines*, Section 15091).

If there are one or more significant unavoidable impacts that cannot be substantially and feasibly mitigated and the Lead Agency decisionmaker (Marin Municipal Water District Board of Directors) decides to approve the project, it must prepare a Statement of Overriding Considerations (per *CEQA Guidelines*, Section 15093) setting forth in writing the reasons for approving the project despite the environmental impacts which may result from project construction. This process requires the decisionmaker to balance the benefits of a proposed project against its potential significant environmental impacts in determining whether to approve a project. The Statement is prepared after the Final EIR has been completed and certified as complete and adequate, and it is preserved in the record of the project approval (if the project is approved).

## **1.4 PUBLIC REVIEW AND COMMENT**

### **A. Notice of Preparation**

MMWD issued a Notice of Preparation (NOP) of a Draft Environmental Impact Report for the Draft Plan on August 4, 2004. The NOP is contained in Appendix A of this EIR. The formal Public Review Period for the NOP extended from August 4 to September 2, 2004. Two responses were submitted during the review period, including responses from the Marin County Open Space District and the California Department of Fish and Game. Copies of these comment letters are included in Appendix A.

### **B. Distribution of the Draft EIR**

A public review period of 45 days is provided for this Draft EIR. This review period begins on the publication date of the Notice of Completion of the Draft EIR. Public agencies and interested individuals may submit comments on the Draft EIR in writing to Eric McGuire, Environmental Coordinator, Marin Municipal Water District, 220 Nellen Avenue, Corte Madera, CA 94925. During the public review period, MMWD will also hold a public hearing to take verbal comments on the Draft EIR.

### **C. Certification of the Final EIR**

Once the public review period is closed, a Final EIR will be prepared. The Final EIR will incorporate this Draft EIR by reference. It will contain all written and verbal comments on this Draft EIR, responses to those comments, and any revisions to the text of this Draft EIR. The MMWD Board of Directors will consider the EIR and certify the document. The Final EIR must be certified before any action on the Draft Plan can occur. After the Board has certified the EIR and, if it approves the Draft Plan, it will file a Notice of Determination with the State Office of Planning and Research and the Marin County Clerk.

Before the plan is approved, the Board would be required (in accordance with *CEQA Guidelines* Section 15091) to make one of the following findings for each significant impact of the project: (1) that changes in the project decrease the impact to a level that is less than significant, (2) that such changes are within the jurisdiction of a public agency other than MMWD or (3) that

mitigation measures and alternatives are infeasible. For impacts that MMWD determines cannot be mitigated to a less than significant level, it would be necessary for the Board to issue a Statement of Overriding Considerations (per *CEQA Guidelines* Section 15093) that describes how benefits of the project outweigh those impacts.

## 1.5 PROJECT LOCATION AND SETTING

The Mount Tamalpais Watershed is located in central Marin County and covers approximately 19,000 acres (see Figures 1 and 2). It is adjacent to other large open space and recreational lands including the Golden Gate National Recreation Area (GGNRA), Point Reyes National Seashore, Muir Woods National Monument, Samuel P. Taylor State Park, Mount Tamalpais State Park, several Marin County Open Space Preserves, and numerous other local city and county park lands. These parklands comprise over 150,000 acres of contiguous protected public lands in Western Marin County. The many creeks that have their headwaters in the Watershed flow either into San Francisco Bay, Tomales Bay, or directly into the Pacific Ocean.

The Mt. Tamalpais Watershed consists of the drainage areas for five reservoirs including the entire upper watershed of Lagunitas Creek and Mount Tamalpais itself. It also includes lands just outside or adjacent to the communities of Lagunitas, Forest Knolls, San Geronimo, Woodacre, Fairfax, San Anselmo, Ross, Kentfield, Larkspur, Corte Madera, and Mill Valley (see Figure 2).

The Watershed lies within the Mediterranean climate region of California that consists of wet, mild winters and warm, dry summers. Elevation ranges from 80 feet to 2,571 feet. Topography is characterized by "V"-shaped valleys located between narrow ridge crests, though there are areas with more gently rolling hills, primarily around Bon Tempe Lake and Alpine Lake. The Watershed supports a rich variety of vegetation communities, ranging from grasslands to chaparral, oak woodland, and redwood forests. These communities provide habitat for a wide range of wildlife, including a number of unique (or special-status) species of plants and animals.

Besides providing a watershed for the collection of public water and an important natural area, the Watershed serves as a valuable scenic and recreational open space resource. Hikers, horseback riders, joggers, bicyclists, fisherpeople, picnickers, birders, naturalists and other visitors frequently use the area.

The primary entrances to the Watershed are mainly through neighboring communities, notably Deer Park and Sky Oaks (Fairfax), Natalie Coffin Green Park (Ross), and Throckmorton Ridge and Old Railroad Grade (Mill Valley). There are numerous other well used entrances off of Bolinas-Fairfax Road, Panoramic Highway, and Ridgecrest Boulevard. While residents from neighboring communities regularly use the Watershed lands, visitors come from the greater San Francisco Bay Area, other parts of the United States, and other countries, owing to its proximity to the world-renowned Muir Woods National Monument, the Golden Gate National Recreation Area, and Point Reyes National Seashore.

## 1.6 PROPOSED PROJECT DESCRIPTION

### A. Purpose of the Project

Roads and trails have a number of undesirable effects on the environment. They are the greatest human-caused source of sediment to streams and reservoirs on the Watershed. Other ecological impacts from roads and trails include fragmenting or displacing biological habitat, providing places for unwanted, invasive weeds to expand, and increasing wildlife mortality.

The primary goals and objectives of the Draft Plan are to protect water quality and to devise management practices for the roads and trails. More specifically, the goals are:

- To improve water quality and minimize sediment inputs to the streams and reservoirs;
- To reduce the impact of the road and trail network on wetlands, riparian areas, other environmentally sensitive habitats, and plant and animal species that are listed as threatened or endangered; and
- To reduce the impact of the road and trail network on the Watershed's natural ecological functions.

The objectives of the plan are:

- To make decisions regarding the existing road and trail network (i.e. inventory and categorize the roads and trails and identify which of them the District should officially recognize as system roads and trails);
- To implement Best Management Practices (BMPs) and Environmental Protection Measures in the upgrade and maintenance of the roads and trails in the Watershed; and
- To devise a system for managing all the roads and trails on the Watershed.

During the preparation of the Draft Plan, the District sought to the extent possible to preserve emergency and recreation access consistent with the District's Watershed Management Policy (Board Policy No. 7) and the overall goals and objectives of the plan. The District actively sought comment from interested members of the public and fire departments regarding routes that they favored. Early versions of the Draft Plan were modified in part based on public and agency comment.

### B. Organization of the Draft Plan

The *Draft Mt. Tamalpais Watershed Road and Trail Management Plan* contains five elements. The main element addresses specific erosion problems affecting Watershed streams and identifies road and trail projects needed to control this erosion. The Draft Plan includes an inventory of all trails and roads on the Watershed and makes decisions about which roads and trails will be part of MMWD's official road and trail system, which trails and roads should be reclassified to a different type of trail or road, and which trails and roads should be decommissioned due to environmental degradation and/or redundancy. A third element contains best management practices, design standards, and environmental protection measures. A fourth element identifies a work plan for managing non-system roads and trails (i.e., roads and trails that are not part of the official MMWD road and trail system). The final

element describes how the plan would be implemented and monitored. Each of these elements is described in more detail below.

The District plans to implement the highest priority sediment reduction strategies within 5 years, subject to available resources. The remainder of the strategies would be implemented over the next 10 to 15 years. The full implementation of all the strategies should be completed in 20 years. At any time during this period this plan could be reviewed and amended as necessary based on lessons learned from the actual plan implementation. Any amendments would need to be reviewed for possible environmental impacts pursuant to CEQA.

## **C. Erosion Control**

The erosion control portions of the Draft Plan are based on the recommendations set forth in the *Road and Trail Erosion Inventory and Assessment, Erosion Prevention Implementation Plan, Mt. Tamalpais Watershed, Marin Municipal Water District, Marin County, California* (prepared for MMWD by Pacific Watershed Associates, October 2003). These sites are mapped in detail in the Draft Plan. Figure 3 is a summary map showing the locations of the sites. The aim is to eliminate major erosion sources and to "storm-proof" the road and trail system to minimize future erosion. The Draft Plan includes the Figure 4 that defines "storm-proofed" roads.

The Draft Plan identifies approximately 970 sites on the Watershed that need some form of treatment to eliminate or reduce erosion which would result in sedimentation of streams or reservoirs. Inventoried sediment delivery sites generally fall into one of several categories: road or trail stream crossings, potential and existing landslides related to the road or trail system, gullies below ditch relief culverts and other runoff outfalls, and long sections of uncontrolled road or trail surface and ditch runoff that currently discharge to the stream system. The types of treatments include road and trail upgrading, stream crossing improvements, cut and fill slope stabilization, and road or trail decommissioning. The following summarizes erosion areas and the types of treatment.

### **1. Stream Crossings**

The Draft Plan identifies 372 road-related erosion sites at stream crossings. These sites are shown on Figure 5. These crossings include 305 crossings that have culverts, 56 unculverted fill crossings (an unculverted fill crossing refers to a stream crossing that has no constructed drainage structure to carry streamflow through the road prism), 6 ford crossings, and 3 bridges. An additional 401 stream crossings were inventoried on trails. Eighteen (18) of these crossings on trails were classified as culverted crossings, 108 as fill crossings, 183 as ford crossings, and 79 as bridge crossings. Approximately 83,506 cubic yards of future road-related sediment could possibly be delivered to creeks or reservoirs from erosion at stream crossings, if the crossings were to wash out. An additional, approximately 1,456 cubic yards of sediment could possibly be delivered from the trail-related sites.

Three road design conditions indicate a high potential for future erosion at stream crossings. These include 1) undersized culverts (the culvert is too small for the 100-year design storm flow), 2) culverts that are prone to plugging with sediment or organic debris, and 3) stream crossings with a diversion potential (i.e., the stream overtops the crossing during a storm and flows down the road or trail). The worst scenario is for a culvert to plug and the stream crossing

to wash out or the stream to divert down the road in a major storm. Not all these crossings can be expected to wash out, but over time, many will experience repeated episodes of partial erosion, stream diversion, or complete failure. The rate of failure will be higher for crossings which are abandoned or for those which are not designed to current standards. The biggest problems can be expected during the peak storm events when District resources may be insufficient or not available on a continuous basis to maintain or clear all the culverts during the same storm.

**FIGURE 4**

**CHARACTERISTICS OF STORM-PROOFED ROADS**

The following abbreviated criteria identify common characteristics of “storm-proofed” roads. Roads are “storm-proofed” when sediment delivery to streams is strictly minimized. This is accomplished by dispersing road surface drainage, preventing road erosion from entering streams, protecting stream crossings from failure or diversion, and preventing failure of unstable fills which would otherwise deliver sediment to a stream. Minor exceptions to these “guidelines” can occur at specific sites within a forest or ranch road system.

***STREAM CROSSINGS***

- all stream crossings have a drainage structure designed for the 100-year flow
- stream crossings have no diversion potential (functional critical dips are in place)
- stream crossing inlets have low plug potential (trash barriers & graded drainage)
- stream crossing outlets are protected from erosion (extended, transported or dissipated)
- culvert inlet, outlet and bottom are open and in sound condition
- undersized culverts in deep fills (> backhoe reach) have emergency overflow culvert
- bridges have stable, non-eroding abutments & do not significantly restrict design flood
- fills are stable (unstable fills are removed or stabilized)
- road surfaces and ditches are “disconnected” from streams and stream crossing culverts
- decommissioned roads have all stream crossings completely excavated to original grade
- Class 1 (fish) streams accommodate fish passage

***ROAD AND LANDING FILLS***

- unstable and potentially unstable road and landing fills are excavated (removed)
- excavated spoil is placed in locations where eroded material will not enter a stream
- excavated spoil is placed where it will not cause a slope failure or landslide

***ROAD SURFACE DRAINAGE***

- road surfaces and ditches are “disconnected” from streams and stream crossing culverts
- ditches are drained frequently by functional rolling dips or ditch relief culverts
- outflow from ditch relief culverts does not discharge to streams
- gullies (including those below ditch relief culverts) are dewatered to the extent possible
- ditches do not discharge (through culverts or rolling dips) onto active or potential landslides

- decommissioned roads have permanent road surface drainage and do not rely on ditches

Of the identified stream crossing locations, 360 (97%) of the road-related sites and 206 (51%) of the trail-related sites will need some level of upgrade for the roads and trail network to be “storm proofed.” Preventive treatments include such measures as constructing critical dips (rolling dips) at stream crossings to prevent stream diversions onto the road surface, installing larger culverts at locations where current pipes are under-designed for the 100-year storm flow (or where they are prone to plugging), installing culverts at the natural channel gradient to maximize the sediment transport efficiency of the pipe and ensure that the culvert outlet will discharge on the natural channel bed below the base of the road fill, installing debris barriers and flared culvert inlets to prevent culvert plugging, and installing culvert downspouts to prevent outlet erosion.

## **2. Landslides**

Only those landslide sites related to roads and trails and with a potential for sediment delivery to a stream channel were inventoried. Forty-one (41) potential road-related landslides and 11 trail-related landslides were identified. Most of the potential landslide sites were found along roads where material had been sidecast during earlier construction and now show signs of instability. Potential road-related landslides are expected to deliver about 5,013 cubic yards of sediment to streams on the Watershed in the future; trail-related landslides would add about 161 cubic yards.

Forty (98%) of the road landslides and 8 (73%) of the trail landslides will need some level of upgrade for the roads and trail network to be “storm proofed.” Preventative treatment basically involves physical excavation of the sidecast materials and proper disposal of excess materials. In a few cases, when a minimum road width needs to be maintained, a retaining wall, crib wall or other engineered structure is necessary

## **3. Ditch Relief Culverts**

Only those ditch relief culverts that currently deliver or will potentially deliver sediment to streams in the future were inventoried for the Draft Plan. One hundred fifty-six (156) ditch relief culverts on roads with potential sediment delivery were identified. Gully erosion can occur below ditch relief culvert outlets due to excessive road and/or ditch contribution to the inlet. Gully erosion can also occur as a result of poor installation techniques such as shotgunned outlets (i.e., culverts that stick out in the air above the slope) or the culvert being placed too high in the fill without functional downspouts. Of the 156 ditch relief culverts identified, 150 have been recommended for treatment. These sites are expected to deliver approximately 2,216 cubic yards of sediment to streams and lakes on the Watershed if they remain untreated in the future. Correcting or reducing sediment delivery associated with ditch relief culverts generally involves dispersing excessive ditch flow by installing additional ditch relief culverts, installing rolling dips, and outsloping roads. Reducing outlet erosion below these sites involves installing functional downspouts as well as replacing ditch relief culverts deeper in the fill.

## **4. “Other” Sites**

Approximately 3,420 cubic yards of sediment could be delivered to streams in the next 20 years from 187 “other” road-related erosion sites. Approximately 306 cubic yards could possibly be delivered from 50 “other” trail-related sites. The “other” erosion types are gully expansion along roads, bank erosion of roads and trails that impinge on streams, road or trail rilling, and the



interaction of springs with roads and trails. Some level of upgrade is recommended for 180 (96%) of the road-related sites and 44 (88%) of the trail-related sites.

## **5. Persistent Erosion**

Actively used roads and trails generate a chronic, or persistent, type of erosion and source of sediment. Causes of persistent erosion include: (1) pulverizing and wearing down of the surface by vehicles, horses, bicycles or foot traffic; (2) cutbank erosion (due to natural causes and maintenance activities), (3) inboard ditch erosion (due to natural causes and maintenance activities), and (4) wet weather erosion on the roads and trails. When concentrated runoff runs down a length of unpaved road or trail, it becomes a sediment problem. The longer the uninterrupted length, the more of a problem it becomes.

In the Watershed, 51.4 miles of road were identified that deliver sediment directly to a creek or reservoir or one of their tributaries. These road and trail segments are said to be "hydraulically connected" to the creek channel network. An additional 14.5 miles of hydraulically connected trails were identified on the Watershed. About 50.6 miles (98%) of the hydraulically connected roads and 12.5 miles (86%) of the hydraulically connected trails will need some level of upgrade before they are "storm proofed." Approximately 84,908 cubic yards of road-related sediment could be delivered to the creeks or reservoirs from persistent erosion over the next 20 years if no efforts were made to change road drainage patterns. An additional, approximately 4,546 cubic yards of sediment could be delivered from the trails.

Relatively straightforward erosion prevention treatments can be applied to upgrade road and trail systems to prevent fine sediment from entering stream channels. Road upgrading involves a variety of treatments used to make a road more resilient to large storms and flood flows. The most important of these include stream crossing upgrades (especially increasing culvert sizes to accommodate the 100-year storm flow, and to eliminate stream diversion potential), removal of unstable sidecast and fill materials from steep slopes, and the application of drainage techniques to improve dispersion of road surface runoff. Road drainage techniques include berm removal, road outsloping, rolling dip construction, and/or the installation of ditch relief culverts. The goal of all treatments is to disperse road runoff and make the road as "hydrologically invisible" as is possible.

Some roads will need to be re-rocked after upgrade of a stream crossing, installation of ditch relief culverts, rolling dip construction and road outsloping or insloping are completed.

## **6. Road and Trail Decommissioning**

The Draft Plan contains a full description of the methods to be used for decommissioning certain roads and trails (see Subsection E below for a summary of trails and roads scheduled for decommissioning). In order to protect the aquatic ecosystem, the goal is to "hydrologically" decommission the road, that is, to minimize the effect of the road on natural hillslope and watershed runoff. From least intensive to most intensive, decommissioning work will include at least some of the following tasks:

1. Road ripping or decompaction, in which the surface of the road is "decompacted" using mechanical rippers (usually ripping teeth mounted on the back of a bulldozer). This action reduces surface runoff and often dramatically increases revegetation rates.
2. Waterbars and cross-road drains are installed at 50, 75, 100, or 200-foot intervals, or as necessary at springs and seeps, to disperse road surface runoff. Cross-road drains are large ditches or trenches excavated across a road surface to provide drainage and to prevent the collection of concentrated runoff on the former road bed. They are typically deeper than waterbars and do not allow for vehicle access.
3. In-place stream crossing excavation is a decommissioning treatment that is employed at locations where roads were built across stream channels. The fill (including the culvert) is completely excavated and the original streambed and sideslopes are exhumed (uncovered). Excavated spoil is stored at nearby stable locations where it will not erode. A stream crossing excavation typically involves more than simply removing the culvert, as the underlying and adjacent fill material must also be removed and stabilized.
4. Exported stream crossing excavation is a decommissioning treatment where stream crossing fill material is excavated and spoil is hauled off-site for storage. Spoil is moved farther up- or down-road from the crossing, due to the limited amount of stable storage locations at the excavation site. This treatment frequently requires dump trucks to end-haul spoil material to the off-site location.
5. In-place outsloping ("pulling the sidecast") calls for excavation of unstable or potentially unstable sidecast material along the outside edge of a road prism or landing and replacement of the spoil on the roadbed against the adjacent cutbank, or within several hundred feet of the excavation site. Placement of the spoil material against the cutbank usually blocks access to the road and is used in road decommissioning.
6. Exported outsloping is comparable to in-place outsloping, except spoil material is moved off-site to a permanent, stable storage location. Where the road prism is very narrow, where there are springs along the road cutbank, or where continued use of the road is anticipated, spoil material is typically not placed against the cutbank and material is end-hauled to a spoil disposal site. This treatment frequently requires dump trucks to end-haul spoil material. This is typically a decommissioning treatment when part or all of the roadbed is removed.

Road decommissioning does not have to include full recontouring of the original road bed. Typically, potential problem areas along a road are isolated to a few locations (perhaps 10% to 20% of the road to be decommissioned) where stream crossings need to be excavated, unstable landing and road sidecast fill needs to be removed before it fails, or roads cross potentially unstable terrain and the entire prism needs to be removed. Most of the remaining road surface simply needs permanently improved surface drainage, using decompaction, road drains, and/or partial outsloping. While complete decommissioning may not be needed to attain sediment reduction goals, MMWD may construct more extensive decommissioning to dissuade use of the road or trail and/or to return the site to a more natural state. The road surface should receive revegetation treatments in locations where eroded sediment could be delivered to a stream (such as the sideslopes to excavated stream crossings), but in the cool coastal setting,

much of the decommissioned alignment can be left to naturally revegetate from nearby seed sources. Trail decommissioning uses similar techniques but requires much less effort.

## **7. Summary**

Future erosion from inventoried road and trail locations is predicted to deliver about 186,305 cubic yards of sediment (about 179,500 cubic yards from roads and 6,805 cubic yards from trails) to area streams over the next twenty years. Implementation of the projects in the Draft Plan would potentially reduce sedimentation by up to that amount.

### **D. Best Management Practices, Design Standards, and Environmental Protection Measures**

The Draft Plan contains a chapter devoted to describing the Best Management Practices (BMPs), Design Standards, and Environmental Protection Measures that MMWD and its contractors will use when constructing the various Draft Plan projects. These include discrete BMPs for the installation of road and trail surface drainage improvements and hillside drainage, culverts, and stream crossings. Design standards are provided for trail siting and location in the few locations where the Draft Plan recommends rerouting of an existing trail. The Environmental Protection Measures include measures to:

- Protect creeks;
- Minimize disturbance and confine work to areas already disturbed, as feasible;
- Schedule work to avoid seasonal or species related environmental impacts;
- Conduct pre-construction notification, education, inspection, and monitoring around sensitive sites;
- Provide temporary erosion control;
- Retain and reuse topsoil;
- Control invasive plants;
- Road maintenance ( e.g. seasonal closures, inspections, minimizing road grading, ditch and culvert maintenance, etc.);
- Prevent sidecasting of material where it could end up in creeks;
- Removal of creek crossings and unstable fillslopes where decommissioning a road; and
- Revegetation

### **E. Road and Trail System**

MMWD intends to manage its roads and trails in a way that minimizes stream sedimentation and other undesirable environmental impacts. All of the approximately 100 miles of roads and 110 miles of trails identified in the field inventory were evaluated based on their effects on water quality, habitat, patrol and maintenance costs, and route connectivity or redundancy. "System" roads and trails refer to roads and trails that are part of MMWD's official road and trail system. "Non-system" roads and trails are trails that are not part of the official system and are not signed nor maintained by MMWD (also known as "social," "abandoned," "illegal," or "unofficial" routes). Non-system routes generally became established by people using game trails or traveling from an existing road or trail to some desirable location where there was no trail. Other people would

follow these routes until an unofficial trail became established. In some cases, people purposely (and illegally) constructed these trails by removing dead and live vegetation and doing some earthwork. Based on this review, the Draft Plan recommends the following:

- Four (4) system roads (Upper Peters Dam, Old Vee, Lower Eldridge Grade, and the southeast end of Concrete Pipe Roads) will be converted to Class IV roads "small vehicle roads" (i.e., roads capable of allowing access by all-terrain vehicles and small equipment but not full-size trucks or cars).
- Three (3) system roads (Azalea Hill, Bon Tempe Channel, and Big Trees Roads) will be converted to some type of trail.
- Bon Tempe Road (unpaved system road) will be paved.
- Four (4) system roads (Bald Hill Trail to Five Corners, Deer Park Trail to Worn Springs Road, and Laurel Dell to Barth's Retreat, as well as minor rerouting of Boy Scout Road) will be converted to trails and rerouted, and four system trails (Azalea Hill, Upper Canyon, Little Carson, and the bottom of Junction Trails) will be rerouted.
- All or parts of 7 system roads (Lagoon, lower portion of Grassy Slope, end of Worn Springs, end of Oat Hill, Interior Pine Point, Bare Knoll, and Peters Dam Roads) and 4 trails (Upper Berry, upper portion of Little Carson, lower portion of Telephone, and Ridge Trails) will be decommissioned. Boy Scout Road will also be decommissioned as a road, and a trail reroute would be constructed along or near that road.
- Eleven (11) non-system trails (Buckeye, Vic Haun, Easter Lily, Benstein Spur, Tucker Cutoff, an unnamed route from Oat Hill Road to Carson Falls, School, Yolanda Cutoff, Mountain Top, Potrero Meadow, and Pine Point Fishing Shortcut Trails) will be adopted as part of the official road and trail system.

These proposed changes to the road and trail system are shown on Figure 6.

## **F. Non-System Routes**

As described above, 11 non-system trails will be adopted as part of the official trail system. Specific erosion reduction projects are recommended for certain non-system trails that are generating significant erosion. Non-system trails will be monitored to determine whether their use is causing significant erosion or other environmental harm. As warranted, MMWD will implement responses ranging from minor efforts to close the trail (e.g., covering the access with branches or logs) to signing, installation of barriers, full restoration of the trail, and aggressive patrolling. The Plan does not include a list of specific non-system trails that could be closed or decommissioned. The Plan includes methods of educating the public and user groups about the plan and the trail and road system, enforcement strategies, and a discussion of the ability to close areas where necessary.

## **G. Implementation and Monitoring**

Projects included in the Draft Plan will be scheduled in a 5-year schedule that will be annually updated. The public will be notified about the plan and upcoming projects. The Plan will be annually reviewed and modified, if warranted. Plan amendment will be done in conformity with District Watershed management policy, laws and regulations governing the District, general provisions of this Plan, and all other applicable state and Federal laws. Any proposed amendment will occur only after a public hearing(s), required environmental review, and Board approval (for substantial amendments).

## 1.7 PROJECT REVIEW AND REQUIRED APPROVALS

The Marin Municipal Water District (MMWD) is the public agency responsible for approving and carrying out the proposed project and is considered the Lead Agency under CEQA. MMWD is responsible for preparing and adopting this Program Environmental Impact Report (EIR) and either approving or rejecting the plan or approving an amended plan after the EIR has been circulated for public review and comment.

While approval of the Draft Plan itself does not need approvals or permits from any other agencies, actions proposed in the Draft Plan will or may require permits from several agencies, as described below.

As part of preparing this EIR, MMWD met with the agencies that would need to issue permits, and most of these agencies participated in field trips hosted by MMWD staff so they could familiarize themselves with the Watershed, some of the existing erosion problems, and some of the solutions similar to those proposed in the Draft Plan. All the agencies were supportive of the Draft Plan objectives. While MMWD will need the appropriate permits and approvals, just like any other project applicant, the agencies recognize that the primary aim of this project is to improve water quality of the streams that drain the Watershed, and this is a beneficial objective that all the other agencies share. Even though all agencies concur that erosion on the Watershed should be reduced and controlled, the agencies need to ensure that the individual projects do not cause significant impacts to water quality, Special Status Species, and other sensitive resources. The various permits and approvals the agencies would provide would include the conditions/mitigations needed to avoid such impacts or reduce them to a less than significant level. This EIR provides the background and assessment data needed for the agencies to make those decisions and determine the appropriate level of mitigation required for each permit/approval.

**U.S. Army Corps of Engineers** - The U.S. Army Corps of Engineers (the Corps) will need to approve a permit(s) to allow "filling" of wetlands and "Waters of the U.S." under the Corps' jurisdiction. Preliminary discussions with Corps' staff (Hicks and D'Avignon, personal communication, 3/10/04 and 5/28/04 respectively) indicate that the Corps would consider the following options:

- MMWD could seek approval of a Regional General Permit (RGP). The RGP would cover all the projects included in the Final Management Plan. Once approved by the Corps, MMWD would not need to contact the Corps regarding future specific projects included in the Final Plan, so long as MMWD complied with the mitigation or conditions established in the RGP. While there are many advantages to MMWD in obtaining an

RGP, it does take some time to expedite such a permit, and the permit is only good for five years. At that time, MMWD would need to apply for a new RGP.

- It is possible that many of the projects included in the Draft Plan could be permitted under already-approved Nationwide Permits (NWP), such as NWP 3 "Maintenance," NWP 13 "Bank Stabilization," NWP 14 "Linear Transportation Projects," NWP 18 "Minor Discharges," NWP 27 "Stream and Wetland Restoration Activities," and/or NWP 33 "Temporary Construction, Access and Dewatering." Multiple NWPs might cover a single project. MMWD could annually submit a list of projects that it proposed to construct in the following year for Corps review. The Corps would make the determination whether the projects would be allowed under one of the NWPs. While it is expected that most, if not all, of the proposed projects would be covered by one of the NWPs, if the Corps determined that a project was not covered by an NWP, then MMWD would need to obtain an individual permit for that project. This is the process currently used by MMWD and the Corps regarding projects to improve the fishery habitat in Lagunitas Creek (the Lagunitas Creek Sediment and Riparian Management Plan). A Biological Opinion was prepared for this overall creek improvement process (U.S. Fish and Wildlife Service, July 2, 1998). Each year MMWD submits preconstruction notifications to the Corps for a group of projects it intends to implement that year. The notifications are also submitted to the California Department of Fish and Game, the County of Marin, and the Regional Water Quality Control Board. The Corps then approves the projects under NWP 27 or another NWP. The RWQCB annually reviews the projects and provides the required Water Quality Certification (see below), though sometimes the RWQCB adds specific requirements for individual projects (Andrew, personal communication, 10/7/04).

As part of the permitting process, the Corps would consult with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration – Fisheries Section (NOAA-Fisheries) to ensure their concerns and conditions (as established in the required Biological Opinion) are included. This EIR provides the data and analysis required for preparation of the Biological Opinions.

Due to a 2001 court decision (*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001)), the Corps no longer considers "isolated" wetlands (i.e., waters not connected to navigable waters) as "Waters of the United States"). Thus, filling of these wetlands does not require a permit from the Corps. However, the Corps does notify the Regional Water Quality Control Board of a jurisdictional disclaimer over these isolated wetlands, and these wetlands are provided protection under the State Water Code and Executive Order W-59-93 which is the State's "No Net Loss" policy for wetlands.

**U.S. Fish and Wildlife Service** – The U. S. Fish and Wildlife Service (USFWS) has responsibility for enforcing the Federal Endangered Species Act (FESA) as regards plants and terrestrial animals. The USFWS will use this EIR and other data available to them to prepare a Biological Opinion which will be used by the Corps to determine whether to issue a permit(s) and what conditions, if any, to protect FESA-listed species should be a part of that permit(s). USFWS staff participated in a field trip of the Watershed where MMWD staff described existing erosion problems and showed examples of past remedial actions. During that field trip, USFWS staff provided recommendations to MMWD staff regarding the permitting process for the Draft Plan. USFWS staff has directed that the Biological Assessment should include four

components. To facilitate USFWS staff in preparing their Biological Opinion, the following identifies where the four required elements are located in this EIR.

1. **Action Area.** Describe the project description which includes the "action area" where impacts to listed species may occur. Section 1.6 outlines the project. Section 3.2 describes and maps the one Federally listed plant on the Watershed. Section 3.3 describes what Federally listed terrestrial wildlife occur on the Watershed. This section also describes how water quality impacts, both beneficial and adverse, could affect listed fish and aquatic species downstream of the Watershed in the four streams that drain the Watershed.
2. **Potentially Affected Species.** Describe listed species that may be affected by the proposed project. Listed plant species that might be affected are described under Subsection 2, Special Status Species in the Setting section of Section 3.2, Vegetation. Listed animal and fish species that might be affected are discussed under Subsection 2, Special Status Species in the Setting section of Section 3.3, Wildlife.
3. **Project Effects.** Describe effects of the proposed project. Possible impacts to the one listed plant species are described under Impact 3.2-A. Impacts to listed fish and animal species are described in Impacts 3.3-A, 3.3-B, and 3.3-C.
4. **Mitigation Measures.** Describe conservation measures that will be taken to minimize effects to listed species. Mitigation measures for the listed plant (as well as any other listed plants that might be found through subsequent field surveys) are listed in the discussion of Impact 3.2-A. Mitigation Measures for impacts to listed fish and animals are listed in the discussion of Impacts 3.3-A, 3.3-B, and 3.3-C.

**National Oceanic and Atmospheric Administration – Fisheries** – the National Oceanic and Atmospheric Administration – Fisheries (NOAA-Fisheries) is responsible for enforcing the FESA as regards fish, sea turtles, and marine mammals. NOAA-Fisheries will use this EIR and other data available to them to prepare a Biological Opinion which will be used by the Corps to determine whether to issue a permit(s) and what conditions, if any, to protect FESA-protected species should be a part of that permit(s). This EIR presents the data that would be needed by NOAA-Fisheries in preparing the Biological Opinion.

**California Department of Fish and Game** - Some projects would include work within the banks of streams. This work would require notification of the California Department of Fish and Game (CDFG) under Section 1602 of the California Fish and Game Code and would require a Section 1603 Streambed Alteration Agreement (SAA) from the CDFG. Preliminary discussions with CDFG indicate that CDFG could issue one SAA to cover all future projects identified in the Draft Plan. Otherwise, a SAA may be required for each project or connected set of projects.

If any project would result in the take of species of plants or animals listed under the California Endangered Species Act (CESA), then MMWD would need to obtain a CESA Permit from the California Department of Fish and Game.

**Regional Water Quality Control Board (San Francisco Bay Region)** - The Federal Clean Water Act (CWA) Section 401 allows states to deny or grant water quality certification for any

activity which may result in a discharge to waters of the United States and which requires a Federal permit or license. Certification requires a finding by the State that the activities permitted will comply with all water quality standards individually or cumulatively over the term of the permit. Under Federal regulations (40 Codes of Federal Register [CFR] 131), water quality standards include the designated beneficial uses of the receiving water, water quality criteria for those waters, and an antidegradation policy. Certification must be consistent with the requirements of the Federal CWA, the California Environmental Quality Act (CEQA), the California Endangered Species Act (CESA), and the State Water Resources Control Board's (SWRCB) mandate to protect beneficial uses of waters of the State.

The Regional Water Quality Control Board (San Francisco Bay Region) (RWQCB) would need to provide Water Quality Certification for the Army Corps permit. If a Regional General Permit (RGP) is sought, the RWQCB could issue the Water Quality Certification for the entire permit or a part of the activities under the RGP; the RWQCB might also issue Waste Discharge Requirements in addition to the certification. Individual projects that receive certification under the auspices of the permit would not need individual Water Quality Certification from RWQCB. However, the RWQCB may request that MMWD annually submit a list of projects that would be conducted in the following year and require monitoring and reporting for those projects.

If MMWD selects the second option of annually providing the Corps with a list of projects for that year, this list would need to obtain Water Quality Certification (i.e., the Certification would cover all the projects on the list). The RWQCB may also issue Waste Discharge Requirements (WDRs) for the projects. The RWQCB may request that MMWD annually submit a list of projects that would be conducted in the following year and require monitoring and reporting for those projects. The Water Quality Certification and the WDRs (if required) would include the Best Management Practices to be used when constructing each project. This EIR provides a list of such BMPs for RWQCB review.

For "isolated" wetlands not under the jurisdiction of the Corps (i.e., isolated wetlands that the Corps no longer has jurisdiction over following a 2001 lawsuit; called SWANCC wetlands), filling may be allowed under General Waste Discharge Requirements (GWDRs) adopted by the State Water Resources Control Board. There are likely very few SWANCC wetlands on the Watershed. These GWDRs apply to small projects where the fill discharge is no greater than 0.2 acres or 400 linear feet. Larger projects may require individual WDRs. Coverage under the GWDRs requires a Mitigation Plan showing how there would be no net loss of wetlands. However, it is possible that such a plan would not be required for the Draft Plan since MMWD should be able to show that projects under the Draft Plan would result in an overall net benefit to Watershed wetlands. For example, about 290 feet of stream would be "daylighted", the width of some crossings would be reduced when downgrading a road classification, and streams would not be filled with sediment or be subject to damaging erosion.

MMWD would not be required to submit a Notice of Intent to file for coverage under the State's General Construction Permit. This permit is not intended to cover road maintenance projects or a series of disconnected projects along a "linear path" (Lafer, personal communication, 9/14/04), though construction of a new road or trail that included one acre or more of disturbance would require coverage under this permit. In addition, the BMPs that would reduce erosion during construction would be required as part of the Water Quality Certification and/or WDRs required for the projects.



## Approval of Projects Included in the Draft Plan

Once the Final Plan is approved by the MMWD Board, MMWD will be able to pursue implementation of projects included in the Final Plan. MMWD will not need to conduct subsequent CEQA review of individual projects so long as MMWD evaluates each subsequent project and makes the following two findings:

- The project will not result in any environmental effects that were not examined in the Program EIR. MMWD should document this finding for each project and project site using a checklist or similar device (14 Cal Code Regs §15168(c)(4)).
- The project will not result in any new environmental effects, or no new mitigation measures would be required due to changes in the activity or changes in the circumstances under which it is undertaken (14 Cal Code Regs §15168(c)(4)). In making this determination, MMWD must find, in accordance with 14 Cal Code Regs §15162, that the conditions triggering the need to prepare a subsequent EIR to evaluate project impacts or mitigation measures do not exist (14 Cal Code Regs §15168(c)(2)). Such triggering conditions include: 1) changes in the project or the circumstances under which it is undertaken that require evaluation of new significant environmental effects, and 2) the availability of new information relating to significant effects or mitigation measures that was not known and could not have been known when the previous EIR was prepared (14 Cal Code Regs §15162).

It is expected that this EIR adequately addresses the impacts and mitigation measures for each of the subsequent projects and that MMWD will not need to conduct subsequent CEQA analyses, at least until there is a major change in environmental conditions. MMWD will need to conduct site surveys for all sites not already surveyed (as listed in this EIR) to determine which mitigation measures will apply to the specific site and project at that site. To ensure that all mitigations are correctly applied, MMWD should keep a checklist or similar device for noting the conditions at the site and what mitigation measures were required. This requirement will be formalized in the Mitigation Monitoring and Reporting Program.

## 2.0 SUMMARY CHAPTER

## **2.0 SUMMARY CHAPTER**

### **2.1 SUMMARY OF PROJECT**

The Marin Municipal Water District (MMWD) proposes to adopt the *Draft Mt. Tamalpais Watershed Road and Trail Management Plan* (Draft Plan). The Draft Plan contains five elements. The main element addresses specific erosion problems affecting Watershed streams and identifies road and trail projects needed to control this erosion. The Draft Plan includes an inventory of all trails and roads on the Watershed and makes recommendations about which roads and trails will be part of MMWD's official road and trail system, which trails and roads should be reclassified to a different type of trail or road, and which trails and roads should be decommissioned due to environmental degradation and/or redundancy. A third element contains best management practices, design standards, and environmental protection measures. A fourth element identifies a work plan for managing non-system roads and trails (i.e., roads and trails that are not part of the official MMWD road and trail system). The final element describes how the plan would be implemented and monitored.

### **2.2 MAJOR CONCLUSIONS**

This Draft EIR identifies a number of impacts that could result over the next twenty years from implementation of projects included in the Draft Plan. The following subsections summarize the more important potential impacts and the conclusions of this EIR.

#### **Hydrology and Water Quality**

A principal objective of the Draft Plan is to reduce potential erosion from Watershed roads and trails thereby reducing the amount of sediment that enters streams draining the Watershed and Watershed reservoirs. It is estimated that constructing the projects included in the Draft Plan would reduce sedimentation by as much as 186,305 cubic yards of sediment over the next twenty years. By reducing the amount of sediment entering streams and reservoirs, MMWD will be improving the quality of the water (e.g., reducing the turbidity in the water) and improving the streambed conditions of the streams. Thus, the long-term impacts on water quality would be beneficial.

Constructing the various projects would require grading, excavating, and other actions involving disturbing earth. Unless the disturbed areas are properly protected and treated, sediment can wash off these disturbed areas, particularly during the first rainy season following the disturbance. This construction-generated erosion is expected to be short term, as the exposed slopes will soon stabilize and be revegetated or otherwise protected given the restoration techniques included in the Draft Plan. However, this EIR identifies potentially significant construction-related erosion and sedimentation from all types of projects included in the Draft Plan. This includes potential erosion and sedimentation from road and trail repairs, particularly repairs at stream crossings, road and trail decommissioning, and constructing new trail reroutes. To address these concerns, this EIR expands on the Best Management Practices (BMPs) for erosion control that MMWD has included in the Draft Plan and recommends 40 mitigation

measures and BMPs to specify how short-term, construction-generated erosion and sedimentation would be controlled. The EIR concludes that with implementation of these mitigation measures, the short-term water quality impacts would be reduced to a level that is less than significant, while, as mentioned above, the long-term impacts would be beneficial.

## Vegetation

The Watershed supports a rich diversity of plant communities and uncommon species of plants. All plant species that are listed by the Federal or State governments as either endangered, threatened, or a species of concern or plant species listed in the *Inventory of Rare and Endangered Plants of California* prepared by the California Native Plant Society are considered as Special Status Species. Over the long term, the projects included in the Draft Plan would provide more native plant habitat than currently occurs. It is estimated that trail and road decommissioning would provide an additional 6.5 acres of habitat. While trail reroutes would remove some native vegetation, the abandoned routes would be available for native plant recolonization. The reduction in erosion and sedimentation also benefits aquatic and riparian vegetation. The long-term impacts on vegetation would be beneficial.

The short-term impacts of construction of the projects include, in some cases, removing vegetation from areas to be repaired/improved or areas proposed for decommissioning or new trail locations. This EIR assesses the range of these impacts on vegetation. The Watershed contains two Special Status Species which are threatened or rare species with protection under the Federal or California Endangered Species Acts. The EIR includes mitigation measures that ensure that these plants will not be affected by any projects included in the Draft Plan. The Watershed supports up to thirty species which are listed by the California Native Plant Society as worthy of protection or consideration when developing projects. It is expected that few of these species could be affected by Draft Plan projects. Additionally, this EIR recommends that projects occurring in areas supporting these species be designed to avoid the plants to the maximum degree feasible. Where avoidance is not possible, the EIR recommends reintroduction of the affected species in the nearby area. It is concluded that the EIR-recommended mitigation measures would reduce short-term construction-generated impacts on Special Status Species to a less than significant level.

Draft Plan projects could also adversely affect sensitive or uncommon habitats like streambeds, riparian habitat, and wetlands. This EIR recommends that projects will be constructed to remove only the minimum amount of native vegetation required for the project. MMWD will cover exposed areas with mulch or topsoil to speed revegetation. In some cases, direct seeding may be used. Mature trees and snags will be removed only if needed to address a significant erosion source. In decommissioning roads and trails, fillslopes containing mature trees or sensitive vegetation would not be removed unless it is a safety hazard. New trail reroutes will be planned to minimize the loss of mature trees, wetlands, and other unique vegetation. Natural wetlands created by springs and seeps shall be preserved. A few scattered wetlands created in roadside ditch drainages or at the ends of culverts may be filled. However, the filling of these small, isolated wetlands would be more than compensated for by the at least 290 feet of new streambed the Draft Plan would produce (i.e., new streambed resulting from removal of streambed crossings on decommissioned roads and trail). In addition, the EIR recommends that wetland vegetation at culvert ends be protected to the maximum degree feasible, and the new culvert will be placed to maintain the wetland. It is concluded that the

EIR-recommended mitigation measure, along with the environmental protection measures included in the Draft Plan, would reduce all impacts to wetlands and sensitive vegetation communities to a less than significant level.

Project construction could result in spreading of broom seed or seed of other undesirable non-native plant species. This EIR contains mitigation measures to ensure this spreading of undesirable seed or plants does not occur. The impact would be reduced to a less than significant level.

## **Wildlife**

The projects included in the Draft Plan will result in improved water quality and reduced sedimentation of streambeds. These effects would beneficially impact coho salmon, steelhead trout, red-legged frogs, yellow-legged frogs, California freshwater shrimp and other fish and aquatic wildlife. The projects would result in 290 feet of additional streambed and 6.5 acres of native plant habitat. This would benefit wildlife. The closure and decommissioning of all or portions of thirteen roads and trails would provide additional habitat where the presence of humans and dogs would be significantly reduced. The Draft Plan also includes measures to control illegal construction of new trails on the Watershed. This would benefit wildlife sensitive to human and dog presence. Thus, the long-term impacts of the Draft Plan on wildlife would be beneficial.

Constructing the Draft Plan projects could have adverse short-term impacts on a number of wildlife resources. The Watershed supports the Federally Threatened northern spotted owl, coho salmon, and steelhead trout. The EIR requires that work in areas where northern spotted owls nests occur outside their nesting season and that trees used for nesting be preserved. The Watershed also supports as many as 17 species of birds, 8 species of mammals, 1 species of amphibian, and 1 species of reptile that are considered Federal and/or State Species of Special Concern. Breeding locations for these birds and animals would also be protected during project construction.

As described previously under Hydrology and Water Quality, construction of many of the Draft Plan projects could result in short-term erosion and stream sedimentation. This sedimentation could adversely affect the Federal and State-listed species on and downstream of the Watershed. However, the EIR-recommended mitigation measures to control erosion would result in this impact being reduced to a less than significant level. Additional mitigation measures are provided to protect the remaining yellow-legged frog populations in the Big Carson and Little Carson Creek drainages.

Project construction could destroy bird nesting sites or generate sufficient noise to cause nesting birds to abandon their nest. The EIR requires that projects that would adversely affect nesting for Special Status Species of birds be constructed outside the nesting season. Similarly, the EIR requires that projects not be constructed to interfere with roosting of the 7 bat Species of Special Concern and badgers. Project construction often requires the use of heavy equipment and power tools which can directly kill or injure wildlife. The EIR requires that project sites be searched for wildlife prior to construction and that animals be moved out of the construction area when found before or during construction. It is concluded that the Draft Plan

complete with EIR-recommended mitigation measures would reduce short-term, construction-generated impacts to wildlife to a less than significant level.

## **Other Resources**

The potential impacts of constructing the projects included in the Draft Plan on other environmental resources were assessed in an Initial Study (included in Appendix A) prepared for the Draft Plan and circulated for agency review. It was determined that the Draft Plan would have no impact or a less than significant impact on most other resources. There were four exceptions. First, project construction would generate dust, adversely affecting air quality. Standard dust control mitigations were recommended to address this impact. Second, project construction could damage or destroy archaeological resources. The EIR provides a procedure for identifying these resources. The EIR provides a standard set of mitigations for protecting and addressing these resources if they are found on a project site.

Third, some projects require construction of bridges or retaining walls. To ensure that such projects do not fail, the EIR requires they be designed by a qualified geotechnical engineer. Lastly, construction of projects using heavy equipment near residences could have a noise impact. The EIR requires construction to be limited to hours that would not significantly affect residents of those homes. With these mitigation measures, the impacts of constructing Draft Plan projects on other environmental resources are all reduced to a less than significant level.

## **Cumulative Impacts**

Other projects on the Watershed and in the immediate area that might combine with the Draft Plan to generate cumulative impacts are four other plans to improve environmental conditions in the area. These plans include MMWD's *Mount Tamalpais Area Vegetation Management Plan* (VMP) and its *Lagunitas Creek Sediment and Riparian Management Plan*, the *Cascade Canyon and White Hill Open Space Preserves Draft Management Plan* being prepared for two adjacent open space preserves owned and managed by the Marin County Open Space District, and the Big Lagoon Wetland and Creek Restoration Project proposed by the National Park Service and the Golden Gate National Parks Conservancy. In addition, there is the possible Marin Stables replacement project and the proposed Concrete Pipe Road Pipeline Replacement Project. The Draft Plan, these four other plans, and the Marin Stables replacement project will improve water quality, stream conditions, native plant habitat, and wildlife habitat on the Watershed, in streams draining the Watershed, and on adjacent public lands. Most Draft Plan projects located along the route of the Concrete Pipe Road Pipeline Replacement Project would be implemented while replacing the pipeline and would not cause any substantially increased effects beyond those associated with replacing the existing pipe.

Projects included in these four plans and the other two projects could have short-term impacts on water quality, plants, wildlife, wetlands, and other resources similar to those described for Draft Plan projects. No additional mitigation measures beyond those recommended in this EIR are needed to reduce potentially significant cumulative impacts from the Draft Plan plus the *Cascade Canyon and White Hill Open Space Preserves Management Plan*, the *Mount Tamalpais Vegetation Management Plan*, and the *Lagunitas Creek Sediment and Riparian Management Plan*. Subsequent project-specific CEQA studies of the proposed Redwood Creek/Big Lagoon project, the Marin Stables redevelopment project, and the Concrete Pipe

Road Pipeline Replacement project (Phase 2) would need to identify mitigation measures for those projects, but it is not expected that additional mitigations would be needed for Draft Plan projects near or interacting with those projects. The long-term cumulative impact of all these projects would be beneficial. It is expected that the cumulative short-term impacts resulting from construction of discrete projects would be reduced to a less than significant level.

## Conclusion

Implementing the projects included in the Draft Plan over the next twenty years will benefit the natural environment on the Watershed and in streams draining the Watershed. The actual construction of these hundreds of discrete projects could have short-term adverse impacts on water quality, native vegetation, wetlands, streambeds, and wildlife. The mitigation measures included in the Draft Plan and in this EIR would be expected to reduce these short-term, construction-generated impacts to a less than significant level.

## 2.3 AREAS OF CONTROVERSY

The Draft Plan raises issues and some areas of controversy that will be considered by MMWD decisionmakers. Controversial issues are known through expressions of public opinion that are documented in the record or obtained through public meetings. Prior to circulating the DEIR, MMWD circulated a NOP to agencies and interested parties. In addition, MMWD held three public hearings over more than two years while preparing the Draft Plan. As previously noted, during the preparation of the Draft Plan, the District sought to the extent possible to preserve emergency and recreation access consistent with the District's Watershed Management Policy (Board Policy No. 7) and the overall goals and objectives of the plan. The District actively sought comment from interested members of the public at public meetings and fire departments regarding routes that they favored. Early versions of the Draft Plan were modified in part based on public and agency comment.

Some areas of controversy are not within the purview of CEQA, because that statute focuses on evaluation of significant effects to the *physical environment*. The non-environmental issues are included below, however, to help provide information to MMWD decisionmakers. The main areas of controversy and recommendation expressed to date are as follows:

- Commenters stated that certain system trails and roads proposed for decommissioning, rerouting, or conversion to another use should be either maintained in their current state or converted to a different use than the one proposed. Specific roads and trails that were mentioned included: Bare Knolls Road (convert to a trail but leave open), Upper Berry Trail (should be rerouted as it approaches Lagunitas-Rock Springs Road, but should not be decommissioned), and Ridge Trail. *See the discussion of Alternative 2 in Section 4.4 which assesses the impacts of not decommissioning the roads and trails targeted for decommissioning.*
- Non-system trails should be left open for use so long as significant environmental problems are not caused by that use. Many of these non-system trails should be adopted as part of the system. Commenters mentioned a number of non-system trails or roads they did not

want to see closed or decommissioned. Particular roads and trails mentioned included: East Peak Fire Trail, Lagunitas Fire Trail, Liberty Trail, and Music Stand Trail. *The Draft Plan does not include recommendations for decommissioning specific non-system trails. Instead, these trails will be monitored for use and possible environmental degradation. Where substantial degradation is found, MMWD may close that trail or restrict its use.*

- Commenters recommended adopting additional non-system trails as part of the trail system. Particular trails mentioned included: California Riding and Hiking, No Name, Alice Eastwood (adopt and repair), Murray, Music Stand, Redwood Spring, and Zig-Zag Trails. *The position of MMWD staff is that the Watershed already has ample trails. The District has no plans to close these non-system trails except for the eroding section of Redwood Spring Trail below the spring.*
- MMWD should not close the Marin Stables. While the future use and development of the stables is its own project and independent of the Draft Plan, it is nonetheless discussed in this EIR. *See the discussion in Section 4.2 of this EIR regarding these stables.*
- When trails are constructed or repaired, the repairs on horse trails should be acceptable to equestrians, for example, no stairs like the ones installed on the Taylor Trail should be used on other equestrian trails. *This EIR recommends that new equestrian trails and repairs to existing equestrian trails be constructed per the guidelines in trail construction handbooks for equestrian trails.*
- Sedimentation from trails is a minor issue and should not be an overriding factor in determining trail decommissioning. *See the discussion of Alternative 2 in Section 4.4 which assesses the impacts of not decommissioning the roads and trails targeted for decommissioning.*
- The Watershed should be managed by a multi-agency approach with watershed priorities and not agency priorities. *This opinion will be forwarded to MMWD for their consideration.*
- Signs should be posted on all trails whether they are system trails or not and to provide direction at confusing intersections. *Sign policy is not a part of this erosion control plan. This information will be forwarded to MMWD for their consideration.*
- The Marin County Fire District recommended that Old Vee Road be maintained as a Class III road to allow fire access. *MMWD staff recommends conversion of this road to a Class IV road and states that it will analyze alternate routes to allow adequate fire access.*

## **2.4 SUMMARY OF PROJECT ALTERNATIVES ANALYSIS**

The State CEQA Guidelines requires that an EIR include an evaluation of a range of reasonable alternatives to the project that would feasibly attain most of the project objectives while avoiding or substantially reducing any of the significant impacts of the project. Section 4.4 of this EIR contains a full description and analysis of two project alternatives:



1. No project
2. No trail and road decommissioning

**Alternative 1**, the no project alternative, would maintain the status quo. Thus, some erosion control projects might occur, but there would not be an aggressive, coordinated approach to erosion control. Twelve roads and trails that are proposed for decommissioning would be left open to use. Seven system roads would not be converted to either Class IV roads or trails. Twelve trails recommended to become part of the system would remain non-system trails. Bon Tempe Road would not be paved. This alternative would result in ongoing erosion and sedimentation with corresponding long-term adverse impacts on water quality, streambed conditions, vegetation, and wildlife. There would be no short-term, construction-generated impacts, and, thus, no need for mitigation measures to reduce those impacts. However, these short-term impacts can be reduced to a less than significant level by mitigation measures recommended in this EIR. There would be no officially designated road or trail system or coordinated approach to dealing with the construction of illegal trails on the Watershed. This alternative would not meet the project objectives and would result in more significant impacts to environmental resources than the proposed Draft Plan.

**Alternative 2**, the "no trail and road decommissioning" alternative, would result in the 13 trails and road section targeted for decommissioning to remain open. This would result in more erosion and sediment delivery than the Draft Plan. The alternative would not increase the amount of native habitat on the Watershed and would not open up 290 feet of streambed. Wildlife residing in the areas near the trails and road sections would continue to experience human and dog presence in the area. MMWD would need to continue to maintain and patrol these trails and roads. The only benefit of this alternative is that Watershed visitors would be able to continue to use these trails and road sections. Given the extensive Watershed road and trail system available to the public and the environmental benefits that would result from the Draft Plan-recommended decommissions, this alternative is not superior to the Draft Plan.

Neither of these alternatives has the long-term environmental benefits of the Draft Plan. While the Draft Plan has more short-term, construction-related impacts than the two alternatives, all of these impacts can be reduced to a less than significant level by provisions already included in the Draft Plan and mitigation measures recommended in this EIR. Because the Draft Plan would benefit the environment more than the two alternatives, it is deemed the environmentally superior alternative.

## **2.5 IMPACT AND MITIGATION MEASURE SUMMARY TABLE**

Table 1 provides a summary of the impacts identified in this Draft EIR. The first column of the table describes the impact that would result from buildout of the project. Following that impact is a description of the level of significance resulting from that impact. Levels of significance include "beneficial," "less than significant" (that is, less than significant as measured against significance criteria established for each area of impact), "potentially significant" (i.e., significant prior to implementation of mitigation measures), or "significant." The next column lists the recommended mitigation measures for the impact. Finally, there is a column that describes the significance of the impact after mitigation measures have been implemented.

TABLE 1 - IMPACT AND MITIGATION SUMMARY

IMPAIRMENTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
<b>3.1</b>	<b>Hydrology and Water Quality</b>		
3.1-A	B	No mitigation is required.	B
3.1-B	PS	<p>The following listing of mitigation measures and BMPs shows the measures already included in the Draft Plan in <i>italics</i>; the additional EIR-recommended mitigations or clarification are shown in plain texts (i.e., not in italics). Again, all conditions are presented here even though many of these conditions do not necessarily apply to the impact under discussion. Future impact discussions will reference this list of conditions.</p> <p>3.1-B.1 For each project or a related group of projects to be done sequentially by the same contractor, MMWD will identify which mitigation measures and/or Best Management Practices (BMPs) will be required for that project. The measures/BMPs will be described using a checklist identifying where and when the measures are to be done. MMWD staff will visit the site with the contractor to identify and, if necessary, flag where the measures/BMPs are to be done. The mitigation measures/BMPs shall be included in construction contracts with outside contractors and/or in construction plans for MMWD staff. MMWD staff shall be responsible for monitoring all work to ensure satisfactory compliance. <i>Construction sites will be monitored during and after the completion of the activities to ensure there are no unintended or undesirable environmental effects resulting from the project. When there are special status species populations nearby, the area will be monitored more closely by the District during and after project completion. The level and duration of monitoring will be determined by the District on a case by case basis to ensure that there are no accidental environmental impacts and that all necessary mitigation measures are fully implemented.</i></p> <p>3.1-B.2 <i>Where needed, temporary diversions around the work area will be accomplished using a small cofferdam and flexible pipe. For wet crossings, excavations must begin at the downstream end of the site and is recommended for dry sites worked on near the end of the dry season. When a dam is used, sufficient water will be allowed to pass downstream to maintain aquatic life below the dam. Any equipment work within the stream channel shall be performed in isolation from the flowing stream. If there is any flow when the work is done, the contractor shall construct coffer dams upstream and downstream of the excavation site and divert all flow from upstream of the upstream dam to below the downstream dam. The coffer dams may be constructed with clean river gravel or sand bags, and may be sealed with sheet plastic. Sand bags and any sheet plastic shall be removed from the stream upon project completion. Clean river gravel may be left in the stream, but the coffer dams must be breached to return the stream flow to its natural channel. Standing water, however, may remain in work areas due to the high water table at some sites. The creek flow must remain free of turbidity during grading and all other construction activities.</i></p>	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p>The District and its contractor will be responsible for preventing loose soil from entering flowing water during grading. Methods for preventing turbidity may not prevent fish passage and may not block off a portion of the creek whereby fish could be trapped. The use of silt fencing or similar actions that require trenching into vegetated areas that would otherwise remain undisturbed is generally not preferred. <i>Aquatic organisms in the area filled by the dam will be relocated to a secure section of stream prior to work.</i></p> <p>3.1-B.3 The contractor will establish an outflow point for the dewatering pipe at a downstream location in the creek, even if flows are very low. The outflow point will be approved by the District prior to installation. The contractor will be responsible for maintaining the dewatering system and must use a material for coffer dams, such as sandbags, that will not cause fish to become trapped or caught or pose any other potential hazard to the fish. The contractor will conduct any maintenance or reinforcement or take any additional measures necessary to ensure that the dewatering system functions to limit turbidity. The contractor will take additional measures to ensure that excessive turbidity is not caused when the coffer dams are removed.</p> <p>3.1-B.4 <i>Sufficient erosion control will be in place during and after work to insure that sediment does not enter the stream channel and that there is no increase in stream turbidity levels resulting from construction. Disturbance of streamside vegetation will be the minimum necessary to complete operations. Other restrictions may be applied for specific sites.</i></p> <p>3.1-B.5 The number of access routes, number and size of staging areas, and the total area of the work site activity shall be limited to the minimum necessary to complete the restoration action.</p> <p>3.1-B.6 Because construction work in streams will be conducted during a low flow period when turbidity can impact salmonids, the District and its contractor must exercise extreme care in all actions - even for such actions as walking in the stream – to prevent sediments from being stirred into the creekflow. Operators conducting in-stream work must take care to reduce any possible impacts to streamside vegetation, overhanging limbs, surface gravel, or erosion, or any other environmental effects that are not the direct result of project actions required to implement this job. In particular, all best management practices shall be followed to prevent turbidity or other water quality impacts to either localized work areas or downstream areas where work is not being conducted.</p> <p>3.1-B.7 Any equipment entering the creek will keep movement in the creek and entrances and exits to and from the creek at an absolute minimum. The contractor will be responsible for pre-planning the movements of any equipment into the creek to reduce these movements.</p>	

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p>3.1-B.8 To prevent construction debris from entering the creek, appropriate best management practices set forth in the California Storm Water Best Management Practice Handbooks will be employed. In upland work areas, barriers will be placed between the construction area and the creek to prevent construction debris or surface runoff from entering the creek. <i>The District will install temporary erosion control measures, such as silt fences, erosion control matting, wattles or hay bales, to prevent transport of sediment and other wastes off the project, storage or staging areas that could possibly enter a creek or reservoir.</i> Erosion control will be in place by October 30. <i>Furthermore, the District will control dust at the project, storage or staging areas to prevent the transport of such material into a creek or reservoir. Imported wattle, hay bails, and matting used for erosion control should be certified "weed free."</i></p> <p><i>Mulches, jute netting, and/or native plant materials will be used wherever bare ground can erode into a creek or reservoir. This includes all excavated fillslopes above these waterbodies and all excavated stream crossings. Weed free straw (3,000 to 5,000 lbs/acre) is one of the most common products used for mulch, but there are other products available as well. On steep slopes or in windy areas, mulch will be tacked, punched or secured to the ground. Imported mulch should be certified weed free. Mulched sites will be mapped and monitored for nascent weed populations. Rather than random scattering of debris, vegetative material will be collected and concentrated on slopes adjacent to live streams and other locations where fine sediment may be mobilized and enter the stream system. If there is not enough on-site vegetative debris to achieve the desired level of ground cover, excess vegetation from nearby restoration sites may be utilized or additional materials may be imported to the site. Materials will be selected to comply with MMWD requirements to minimize introduction of exotics and interference with re-establishment of native forest species. The Contractor will be required to assist in the transport of such materials from their point of delivery to the actual job site where they will be used. Site-specific conditions both on the finished slope and within the buffer will affect the amount of ground cover actually needed to achieve the goals of reducing downstream turbidity and suspended sediment. Where particularly vulnerable species or habitat are located immediately downstream, or where highly erodible soils are found, the guidelines shall be adjusted to favor more complete surface erosion control. Conversely, some areas may allow relaxing of guidelines, for example where buffer zones have atypically high sediment trapping efficiency due to topographic benches or particularly dense understory and litter accumulations or where excavated materials contain large coarse fragment content that would readily form an erosion pavement. These guidelines will be used and adapted as needed to actual field conditions to insure that fine sediment is prevented from entering the stream systems as much as is reasonably possible.</i></p>	

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p>3.1-B.9 Potential pollutants (e.g., fuels, etc.) will be stored with proper containment and outside of areas where contact with stormwater runoff or creek waters could occur. Contractors will be held responsible for proper handling of fuels and other pollutants to ensure there is no spillage during refueling or other handling procedures.</p> <p>3.1-B.10 All bridge abutments shall be designed by a civil engineer. Abutments will be armored and otherwise protected as recommended by the designing engineer.</p> <p>3.1-B.11 <i>All work activities will be timed to avoid, or minimize, the environmental impacts of those work activities. Work in a stream crossing will be done during the dry season to help protect water quality and fisheries. Work around streams will be confined to the period of April 15 through October 15 or the first rainfall. In-water work will cease on or before October 15 of any year.</i></p> <p>3.1-B.12 Any disturbed banks shall be fully restored upon completion of construction. Revegetation shall be done using native species. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in the latest version of the California Salmonid Stream Habitat Restoration Manual.</p> <p>3.1-B.13 Planting of seedlings shall begin after December 1, or when sufficient rainfall has occurred to ensure the best chance of survival of the seedlings, but in no case after April 1.</p> <p>3.1-B.14 <i>Prior to any work, the construction crew(s) will be informed of: (1) all necessary environmental protection measures; (2) the location of known special status species populations; (3) the location of any environmentally sensitive habitats; (4) the location of invasive exotic weed species that could infest the project site, and (5) all protective measures included in the project to minimize accidental environmental impacts.</i></p> <p>3.1-B.15 <i>All construction sites will be signed and noticed that a construction project will occur or is in progress. The notice will describe, as appropriate or necessary, the type of work, whether or not the work will result in a road, trail or area closure, the duration of the work activities, when the road, trail or area would be reopened (if applicable), and include contact information for the public so they can get more information on the project.</i></p> <p>3.1-B.16 <i>All construction staging and storage areas shall be identified prior to beginning construction. Whenever possible, the staging and storage areas should be located in areas that have minimal natural resource value like parking areas, roadbeds, and trail beds. In all cases, the staging and storage areas should be returned to, at a minimum, their pre-construction condition.</i></p>	

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p><i>If these areas are associated with a decommissioning or restoration project, they could be included in the restoration also.</i></p> <p>3.1-B.17 <i>Whenever possible, the District will confine its work activities within the alignment of an existing road or trail and avoid impacts to previously untrammelled areas. In most cases, the older, high maintenance insloped routes can be converted to low maintenance outsloped routes without disturbing adjacent areas. When appropriate, such as when special status species populations are in the vicinity of the project, staging or storage areas, the construction crews will be notified of the special status species and the requirement to protect them. If necessary, the sensitive areas will be clearly marked or fenced during the duration of the project to minimize accidental impacts.</i></p> <p>3.1-B.18 <i>Only the areas that truly need to be disturbed will be disturbed. Ditches and cutbanks should be left undisturbed unless they are identified as specific areas needing work. Construction crews will be briefed on what is not to be disturbed on site prior to the commencement of work. When environmentally sensitive habitats or special status species populations are involved, a protective barrier or signage will be installed that indicates the limits of construction and prohibits any work in areas not to be disturbed. In all cases, no sidecasting during maintenance, reconstruction or decommissioning work shall occur, especially near streams.</i></p> <p>3.1-B.19 <i>Placement of excess materials resulting from project activities will be identified in advance. Spoils will be placed in stable areas preferably in areas planned for long-term rehabilitation (former quarry sites, rock terraces near dam sites etc.). Fill material removed from stream crossings and other sites shall be placed onto a road, landing, or skid road, inboard of the toe of the cut and against the existing cutbanks, but shall not exceed existing cutbank height. Fill shall be placed against cutbanks in such a manner that will prevent concentration, containment, or diversion of surface runoff. Fill material shall be placed such that surface runoff cannot enter the stream between the cutbank and the emplaced fill. The finished grade shall be a free draining surface. All berms, tracks, and other surface irregularities shall be smoothed. Fillsites shall not trap or pond surface water, and must create free draining surface flow. Brush, trees and other organic debris (including but not limited to logs and rootwads) encountered or removed during excavation and clearing of fillsite areas are to be distributed over the finished surface in accordance with the post-excavation erosion control guidelines. The fillsite shall be revegetated as warranted.</i></p> <p>3.1-B.20 <i>The District will seek to allow natural reestablishment of native vegetation at construction sites, taking into account the following when determining site-specific revegetation strategies:</i></p>	

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<ul style="list-style-type: none"> <li>• Potential for natural recovery of the vegetation;</li> <li>• Potential for expansion and establishment of invasive, exotic weed species;</li> <li>• Availability of local seed and plant stock; and</li> <li>• Available information on special status species and environmentally sensitive habitats in the area.</li> </ul> <p>3.1-B.21 Whenever possible, the District will reseed disturbed sites by redistributing topsoil and surrounding vegetative litter in the final site dressing. Seeding with imported germ material may be appropriate where extensive areas are disturbed or the native seed bank is degraded. Seed material collected from the Watershed will be used to the fullest extent possible. Seed mixes should be site specific, with species composition drawn from the surrounding plant community. Where rapid establishment of vegetative cover is deemed necessary, seed mixes should be restricted to sterile, annual grass species. Fertilizers and nitrogen-fixing cover crops should not be used, as such "soil enhancers" because they can facilitate invasive, exotic weed establishment.</p> <p>3.1-B.22 Newly seeded areas should be marked on the ground or mapped and protected from disturbance during the germinations season. These areas should also be closed to foot, horse and bicycle traffic. Vehicles should not be parked or driven over seeding weed populations. If necessary, a temporary or permanent access barrier or fence may be installed to prevent damage.</p> <p>3.1-B.23 Following seeding planting perennial species, shrubs and trees, may be appropriate at specific project sites. While these plants ultimately provide better erosion control, they take longer to establish. Species selection should reflect the surrounding plant communities, and plant material should be gathered from the Watershed. To the fullest extent possible, root masses, bulbs, and corms excavated during construction should be preserved and replanted on the project site as part of the final dressing. In some cases, extra care may be needed for the newly planted perennial species to protect them from deer, summer drought and other plant species which may out compete them for sun, water and nutrients.</p> <p>3.1-B.24 Topsoil removed from the project area will be stored for its return to the disturbed site upon project completion. Special care will be applied to any soil supporting special status plant species to minimize excessive disturbance of the soil during its removal, storage and return to the project area.</p> <p>3.1-B.25 Soil will only be compacted to the extent necessary to reduce any surface erosion that may occur in the first heavy rainfall.</p> <p>3.1-B.26 Seasonal Closures. Minimize traffic loads on sensitive roads during the rainy season by seasonally or temporarily closing the roads or trails to certain</p>	

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p>uses.</p> <p>3.1-B.27 <i>Inspections. The District will regularly inspect, before the rainy season, all stream crossings (including culvert trash racks and erosion control features), inboard ditches, ditch relief culverts, rolling dips and waterbars to be sure they will function properly.</i></p> <p>3.1-B.28 <i>Road Grading. The District will grade roads only when needed to maintain an acceptable driving surface and retain proper drainage. The District will grade only when road surfaces are slightly damp so the graded materials get properly mixed, compacted and bound with the underlying materials.</i></p> <p>3.1-B.29 <i>Ditch Grading. Ditches will be graded only when and where necessary. Small plants and annual grasses will be left in ditches if they do not block water movement. This vegetation slows runoff velocities, helps prevent scour and filters out sediments. Often, nothing more than shovel work is necessary to maintain drainage ditches.</i></p> <p>3.1-B.30 <i>Culverts. The District will continue to mark all its culverts with coded signs that indicate where the culvert is located, and in certain cases, their diameter and relative inspection needs (based on its likelihood of plugging or history of problems). The District will continue to maintain a master file of all the culverts and their attributes for quick reference. This file will be regularly updated and maintained to maximize its usefulness. The District will also inspect culverts during periods of high runoff to clear them of debris that may cause plugging. The District will also fix culvert problems as soon as practicable as a delay may cause a failure that could lead to costly road damage.</i></p> <p>3.1-B.31 <i>Bridges. Bridge riprap and other abutment protection structures will be repaired by the District as soon as possible to prevent the loss of the bridge. Large, woody, floating debris will be cut free and removed or floated downstream. Unwanted debris that accumulates on the deck surfaces will be picked up or pushed to the adjacent bank for proper disposal. The District will not dump, push or scrape this material into the creek or reservoir.</i></p> <p>3.1-B.32 <i>Fords. As required, the District may also perform some rock armor maintenance on permanent fords. If the District needs to do maintenance work on a ford it will wait until low flow conditions to minimize impacts to the creek and water quality.</i></p> <p>3.1-B.33 <i>Cutbanks. Cutbanks will be frequently inspected by the District to help identify potential failures before they happen. The District will remove these materials (especially from inboard ditches) before they have an opportunity to enter a creek or reservoir, restore the road or trail surface drainage, and dispose of the material where it will not erode into a creek or reservoir or</i></p>	



**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p><i>create other problems.</i></p> <p>3.1-B.34 <i>Fillslopes. If fillslope material could fall into a creek or reservoir, it should be excavated before it fails. The District will continue to work diligently to maintain proper drainage that helps minimize the development of the cracks and scarps. If movement is persistent, the District will seek an alternative so the fill area is no longer needed or subjected to loading. If more width is needed to maintain safe passage, the District will explore the possibility of cutting further into the hillside, a retaining wall or other structure.</i></p>	
3.1-C	Construction of erosion reduction projects along roads and trails can cause erosion and stream sedimentation.	PS The mitigation measures listed under Impact 3.1-B apply to the potential sedimentation impacts resulting from this category of Draft Plan projects (except for those mitigation measures that are explicitly directed to work within stream channels).	LS
3.1-D	Decommissioning of roads and trails can cause erosion and stream sedimentation.	<p>PS All the mitigation measures pertinent to decommissioning listed under Impact 3.1-B will apply. In addition, the following measure is included in the Draft Plan.</p> <ul style="list-style-type: none"> <li>• <i>Waterbars and cross-road drains will be installed at 50, 75, 100 or 200-foot intervals, or as necessary at springs and seeps, to disperse road surface runoff, especially on roads that are to be decommissioned. Cross-road drains are large ditches or trenches excavated across a road surface to provide drainage and to prevent the collection of concentrated runoff on the former road bed. They are typically deeper than waterbars and do not allow for vehicle access.</i></li> </ul>	LS
3.1-E	Disposing of spoils generated by other projects could result in erosion and sedimentation.	PS Mitigation Measure 3.1-B.19 specifically applies to this impact.	LS
3.1-F	Construction of new trails and road sections could cause erosion and stream sedimentation.	<p>PS 3.1-F.1 The minimum width needed for safe use of the trail will be disturbed for trail construction.</p> <p>3.1-F.2 Trail improvements should be constructed according to recommendations outlined in either the <i>Trail Manual for the Maintenance and Operation of Trails in the East Bay Regional Park District</i> (McDonald 1995), <i>A Handbook on Trail Building and Maintenance</i> (Griswold 1996), <i>NPS Trails Management Handbook</i> (National Park Service, 1983), or the <i>Trails Handbook</i> (California Department of Parks and Recreation 1998). Class VI trails should be built and repaired to allow safe horse passage per guidelines set forth in <i>Trails Manual</i> (Vogel, 1982). Regarding both new and restored trails and roads, the following measures are recommended for trail stability and erosion control:</p> <ol style="list-style-type: none"> <li>a. The trails should travel up and down grade ("undulating grades") to allow rolling dips to dewater the trail.</li> <li>b. Trails shall generally follow a curvilinear alignment. Maximum grades should generally not exceed 10%, though steeper grades can be permitted for short sections; the average slope should be maintained at 7.5% or less.</li> </ol>	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p>c. Class VI trails shall be wide enough to allow safe use by equestrians and hikers. Trails that are expected to have light use generally have trail treads 2-4 feet wide, while heavy use trails are generally designed to be 5-6 feet wide. A maximum of four feet is recommended for the proposed trails.</p> <p>d. Trails shall be constructed with a 3-4% outslope wherever feasible. Two approaches can be applied to gain the desired outslope; a) blade off the outer trail edge with a trail machine or hand implements, or b) import material to raise the inslope portion of the trail. The first approach should be avoided where the trail is close to a drainageway, since the blading operation will deposit some sidecast material on the downslope side of the roadway and the material could be conveyed downslope to the active channel.</p> <p>e. On both insloped and outsloped trail segments, install rolling dips where needed. If rolling dips are not feasible, install water bars at spacings as needed. On especially steep grades, closer spacing may be necessary. The optimal outlet locations for runoff collected and diverted by dips and bars would be on locally convex slopes. Where necessary, rock the outlet.</p> <p>f. Construct stabilized at-grade crossings of streams using the design and construction procedures included in the <i>Handbook for Forest and Ranch Roads - A Guide for Planning, Designing, Constructing, Reconstructing, Maintaining and Closing Wildland Roads</i> (Pacific Watershed Associates 1994), <i>A Handbook on Trail Building and Maintenance</i> (Griswold 1996), or the <i>Trails Handbook</i> (California Department of Parks and Recreation 1998).</p> <p>g. Proper culvert design and construction procedures are outlined in the <i>Handbook for Forest and Ranch Roads - A Guide for Planning, Designing, Constructing, Reconstructing, Maintaining and Closing Wildland Roads</i> (Pacific Watershed Associates 1994). Wherever culverts are installed, construct a rocked apron at the outlet; the stabilized apron should be at a flat or mild grade (e.g. 1-2%); extend a minimum of five feet downslope from the outlet and one foot (vertical) up onto the adjoining banks (higher where outlet channel banks are steeper than 2:1); and comprise strongly embedded (e.g. 60%) larger rock and cobble infill to minimize the risk of erosion within the structural elements.</p> <p>3.1-F.3 When laying out the trail location, MMWD should attempt to locate the trail in locations where any erosion that does occur will be drained to areas that do not connect to the stream system.</p>	

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS		SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
			<p>3.1-F.4 Areas that are disturbed when constructing the trail that are outside the trail tread shall be reseeded with native plant seed, and/or punched straw or other locally available mulch will be placed to protect against raindrop impact and to minimize soil detachment and downslope movement.</p> <p>3.1-F.5 New trail grading or culvert crossing installation should be implemented during the dry season, which from a regulatory standpoint typically extends from April 15 to October 15. Appropriate erosion control measures (i.e. BMPs), including seeding, should also be installed prior to the first rain of the winter season, or by October 15.</p>	
3.1-G	Storage of fuels or other materials could spill and pollute area streams and reservoirs.	PS	Mitigation Measure 3.1-B.9 applies to this impact.	LS
<b>3.2</b>	<b>Vegetation</b>			
3.2-A	Construction of erosion control projects included in the Draft Plan could require removal of Federal or State threatened, endangered, or rare species of plants.	PS	<p>3.2-A.1 Prior to finalizing construction plans for each project, a qualified botanist will survey the area to be disturbed for Marin dwarf flax, Mason's ceanothus, Baker's larkspur, Santa Cruz tarplant, white-rayed pentachaeta, Hoover's semaphore grass, and other Federal or State listed plant species, unless the area has been previously surveyed by the MMWD Vegetation Ecologist.</p> <p>3.2-A.2 All projects will be designed to avoid any Marin dwarf flax, Mason's ceanothus, or other Federal or State listed plant species (if subsequent surveys find these species on the Watershed).</p> <p>3.2-A.3 For projects near known populations, the individual plant will be identified for protection with flagging and construction monitoring will occur to ensure that there will be no adverse impacts to the populations.</p>	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
3.2-B	Construction of erosion control projects included in the Draft Plan could require removal of other Special Status Species of plants.	<p>3.2-B.1 Project sites not yet surveyed for Special Status Species shall be surveyed prior to final project design.</p> <p>3.2-B.2 To the maximum degree feasible, projects will be designed and constructed to avoid eliminating other Special Status Species of plants. Where avoidance of these Special Status Species of plants is unavoidable, then MMWD shall reestablish the plants that are eliminated. Efforts should be made to collect and preserve propagules from the affected population for later reintroduction. Reintroduction can occur near the disturbed area or in other suitable habitat where the species would benefit from reintroduction (e.g., on decommissioned roads and trails or, for reroutes, the old trail/road that is being abandoned, if there are suitable soils and habitat).</p> <p>3.2-B.3 The District will conduct regular training for its permanent and seasonal construction crews in Special Status Species and environmentally sensitive habitats so they are more likely to prevent accidental environmental impacts to these resources. (Also see Mitigation Measure 3.1-B.14.)</p> <p>3.2-B.4 The District shall monitor construction to ensure that plants scheduled for avoidance are protected during the construction process.</p> <p>3.2-B.5 The District will retain records of all surveys and the locations of all special status plants identified at project sites so that these plants can be avoided during construction of any future projects in the area. Roadside plants that could be harmed by normal maintenance activities shall be flagged or otherwise marked so that equipment operators and other staff are aware of their presence and avoid them.</p>	LS
3.2-C	Decommissioning roads and trails could require removal of other Special Status Species of plants.	3.2-C.1 When decommissioning roads, MMWD shall survey the areas to be disturbed for Special Status Species. Areas supporting such plants will not be included in fillslope/cutbank decommissioning unless such decommissioning is critical to repair potentially failing fillslopes that would deposit sediment into streams or decommissioning is essential to closing the route or to restoring the integrity of the habitat, <i>and</i> revegetation of such species is feasible.	LS
3.2-D	Construction of trail and road reroutes, conversion of certain roads to smaller roads or trails, and/or adoption of certain non-system trails as part of the trail system could result in removal of other Special Status Species of plants.	<p>The same mitigation measures recommended for Impact 3.2-B apply. In addition;</p> <p>3.2-D.1 The area where the new trail section for the Potrero Meadow Trail, Laurel Dell to Barth's Retreat Trail, and Azalea Hill Trail could be constructed will be surveyed for the presence and location of Special Status Species of plants.</p> <p>3.2-D.2 To the maximum degree feasible, the location for the new trail shall be selected to avoid destruction of Special Status Species of plants. Where avoidance is not feasible, then revegetation per Mitigation Measure 3.2-B.2 shall apply.</p> <p>3.2-D.3 The Azalea Hill Trail reroute shall be rerouted to avoid the stand of</p>	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p>serpentine chaparral. The non-system trail that proceeds south of the Azalea Hill Trail shall be decommissioned.</p> <p>3.2-D.4 The new trail from Laurel Dell Road to Barth's Retreat should be routed through the Douglas fir woodland to the west of the chaparral area that borders the existing access road.</p>	
3.2-E	Construction of erosion control projects included in the Draft Plan could result in measurable degradation of sensitive habitats.	<p>PS Mitigation Measures 3.1-B.1-8,12-14, 17-18, and 20-24 apply to this impact, In addition, the following mitigation measures are required.</p> <p>3.2-E.1 All projects shall be designed and constructed to remove only that native vegetation needed to accomplish the erosion control objectives. MMWD shall monitor work to ensure only targeted plants are removed.</p> <p>3.2-E.2 Standing trees, snags and stumps greater than one foot in diameter at breast height shall not be damaged or undercut unless authorized by the MMWD Resource Specialist.</p>	LS
3.2-F	Decommissioning roads and trails could result in a loss of sensitive habitats.	<p>PS Mitigation Measures 3.1-B.10-24 and the mitigation measures recommended for Impact 3.2-E apply to this impact. In addition:</p> <p>3.2-F.1 Decommissioned roads and trails should be covered with native mulch available in the site area. MMWD may also collect seeds of plants or live plants common to the area and revegetate the disturbed slope. Decommissioned sections should be ripped or otherwise treated to encourage the establishment of seeds or seedlings. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in the latest version of the <i>California Salmonid Stream Habitat Restoration Manual</i>.</p> <p>3.2-F.2 In locations where there are mature trees on fillslopes or cutslopes, MMWD should make every effort to preserve those trees unless the banks where these trees are growing pose a significant risk of failure.</p> <p>3.2-F.3 Pulling fillslopes back onto the roadbed or trailbed is not recommended for the portions of Lagoon Road that pass through serpentine chaparral or for Upper Berry Trail.</p>	LS
3.2-G	Construction of road and trail reroutes, conversion of certain roads to smaller roads or trails, and/or adoption of certain non-system trails as part of the trail system could result in a loss of sensitive habitats.	<p>PS Mitigation Measures 3.1-B.12-24 apply to this impact. In addition, the following measures are recommended:</p> <p>3.2-G.1 To the degree feasible, MMWD shall lay out the new trail locations to avoid mature trees, mature shrubs, or other sensitive or unique plant specimens. All wetlands shall be avoided other than where it is necessary to cross a stream.</p> <p>3.2-G.2 Class VI trails will be constructed according to accepted equestrian trail standards.</p>	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p>3.2-G.3 MMWD should consider constructing the reroutes of the bottom of Boy Scout Road and the Bald Hill Trail on the existing roadbed.</p> <p>3.2-G.4 The easternmost trail connection between Oat Hill Road and the head of Carson Falls shall be closed and decommissioned. A sign shall be installed explaining the closure and directing the user 0.1 mile to the middle trail access to Big Trees. A sign shall be installed at the Old Sled Trail junction with Oat Hill Road directing people 0.1 mile to the middle trail access to Big Trees. The District could use Carson Falls as the destination on these signs rather than Big Trees; however, it may result in less use of the sensitive Carson Falls area if it were not emphasized on signing.</p> <p>3.2-G.5 The Potrero Meadow Trail reroute shall be constructed along the interface of the meadow and the woodland to the north. In constructing the trail, healthy trees over 8 inches in diameter (DBH) shall be retained. The south-forking trail in the lower meadow shall be closed and decommissioned.</p>	
3.2-H	Construction of projects included in the Draft Plan could result in loss of wetlands.	<p>PS All the mitigation measures recommended for Impact 3.1-B apply to this impact. In addition, the following mitigations are required.</p> <p>3.2-H.1 Prior to designing or finalizing construction documents/plans for each project, a field survey of the project site shall be conducted by a qualified wetland expert. This expert shall identify all Army Corps jurisdictional wetlands and wetlands subject to RWQCB oversight. These wetland delineations and identifications shall be submitted to the Army Corps, California Department of Fish and Game, and the RWQCB when submitting the annual list of projects to be carried out the following year.</p> <p>3.2-H.2 All wetlands created by springs shall be maintained to the maximum degree feasible. If the drainage of the spring must be altered to allow proper road or trail drainage, the District shall strive to create a drainage pattern that provides an equal or greater amount of wetland habitat in the area of the spring.</p> <p>3.2-H.3 Any roadside ditch wetlands will be assessed by the District to determine whether they can be retained. Unless displacement of these wetlands is critical to reducing a substantial erosion problem, these wetlands will be retained.</p> <p>3.2-H.4 When removing culverts for replacement, the minimum amount of vegetation shall be removed. No equipment should be allowed within any wetland.</p> <p>3.2-H.5 Culverts draining upslope wetlands shall be placed so that the inlet is set at the same elevation as the existing culvert to maintain the upslope hydrologic regime.</p>	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<p>3.2-H.6 When decommissioning roads and trails, all wetlands should be retained unless their retention would cause substantial future erosion.</p> <p>3.2-H.7 All ditches supporting wetlands shall be clearly identified so that ongoing road and trail maintenance avoids grading or cleaning these ditches except where needed to restore ditch function.</p> <p>3.2-H.8 Where wetland plants must be removed or wetland habitat is created, the District shall collect seed from wetland plants in the area and reseed the area once construction is complete. Suitable live plants can also be planted. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in the latest version of the <i>California Salmonid Stream Habitat Restoration Manual</i>.</p> <p>3.2-H.9 The District shall abide by any additional permit conditions required by the Army Corps, California Department of Fish and Game, and the RWQCB.</p> <p>3.2-H.10 To ensure there is no net loss of wetlands due to the project, the District is committed to creating approximately 290 feet of new creek as the result of the road and trail decommissioning called for in the Draft Plan. The unavoidable impact of loss of isolated wetlands in in-board ditches due to road re-contouring (subject to Mitigation Measures 3.2-H.1 and 3.2-H.3) shall be assessed, quantified, and calculated for size, condition, function, and value of the ditch wetlands. The loss of isolated, in-board ditch wetlands shall not exceed the 290 feet of new creek that will be created. Once the threshold is reached, no additional wetlands shall be displaced or impacted without further environmental analysis and mitigation.</p>	
3.2-I	Project construction can spread undesirable non-native plant species.	<p>3.2-I.1 Invasive exotic weed populations in and adjacent to project sites will be treated prior to any soil disturbing activities to minimize the seed dispersal of those plants. Sites where imported gravel or other fill materials are installed or stored should be mapped and monitored to prevent the introduction of new weeds.</p> <p>3.2-I.2 MMWD shall monitor project sites and remove new exotic weeds spread into the site area by project construction.</p> <p>3.2-I.3 Monitoring and/or treatment of these sites shall occur quarterly, or until it has been determined that there is no longer a risk of an unintentional release of an invasive, exotic species.</p>	LS
<b>3.3</b>	<b>Wildlife</b>		
3.3-A	Implementation of Draft Plan projects will reduce sedimentation and turbidity in streams draining the Watershed thereby benefiting aquatic wildlife species.	B	B
3.3-B	Construction of specific projects could result in short term erosion thereby adversely affecting turbidity and adding sediment to streams draining the Watershed. This increased turbidity and	PS	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
sediments could adversely affect Special Status Species of salmonids, frogs, and shrimp.		<p>In addition, the following measures are required:</p> <p>3.3-B.1 All work at stream crossings of Little Carson Creek, Big Carson Creek, and their tributaries shall be conducted between September 1 and October 15. Prior to the start of work, a wildlife biologist who is qualified to identify and handle yellow-legged frogs shall survey the area to be affected by the stream crossing project. The biologist shall remove any frogs or tadpoles at risk and release them in a safe location on the creek. The biologist should be present prior to each day's work to relocate frogs and tadpoles.</p> <p>3.3-B.2 MMWD shall install signs that clearly explain that Little Carson Creek from the base of the falls to Kent Lake is one of two drainages in the Watershed currently supporting yellow-legged frogs and what the status of those frogs is. The sign shall explain that dogs or humans entering the stream can crush egg masses, tadpoles, and frogs and that it is imperative that people keep their dogs on leash and that neither they nor their dogs enter the stream channel from the base of the falls to Kent Lake. A second sign shall be placed on the non-system trail that leads from Little Carson Trail to the pool at the base of the falls that explains the trail is closed and the reasons for that closure. This branch trail should be blocked. MMWD shall determine the route of the trail from the head of the falls to the base consistent with its goals to protect yellow-legged frogs while reducing sedimentation.</p>	
3.3-C Construction of projects could destroy the nests of Special Status Species of birds or disrupt nesting birds.	PS	<p>3.3-C.1 If shrubs or trees would need to be removed to construct a specific project, MMWD should remove those trees and shrubs prior to the onset of the nesting season (i.e., after late July and before mid-March of any year) so birds will not nest in trees or shrubs on the construction site. However, trees known to be used for northern spotted owl and golden eagle nesting shall not be removed.</p> <p>3.3-C.2 For projects that would remove trees or shrubs (that were not removed per Mitigation Measure 3.3-C.1) and projects that would use heavy equipment in forested areas or areas of chaparral during the primary bird breeding season (mid-March through the end of July), a qualified wildlife biologist shall examine the project site and surrounding area to determine the presence of nests of any Special Status Species of birds. If said nests are found in trees or shrubs planned for removal and/or if the wildlife biologist determines that the proximity of nearby nests to the site where heavy equipment would be operating would or could result in the adult birds abandoning the nest, work at the site will be scheduled to occur after the breeding season.</p> <p>3.3-C.3 For projects within spotted owl nest areas, heavy equipment will not be operated between February 1 and August 31 within one quarter mile of any spotted owl nest site unless protocol surveys determine the nest is not being used.</p>	LS
3.3-D Construction of projects could kill or injure Special Status Species of terrestrial wildlife or substantially diminish or harm habitat	PS	3.3-D.1 Prior to construction of any project, the site will be surveyed for the presence	LS



**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
essential for the survival of these species.		<p>of badger dens or burrows. If such sites are identified, work shall not start at that site until a qualified wildlife biologist has determined that the den is not active or, if active, until the young have left the site and are capable of surviving away from the site.</p> <p>3.3-D.2 Tree removal larger than 24 inches (dbh) shall occur during one of two time windows: a) after the bat maternity season, when young bats are volant (i.e., flying) (September 1), and before the hibernation period (October 30), or b) after hibernation (March 1), and before birth of young (April 15). Trees smaller than 24-inches dbh not immediately adjacent (within 15 feet) to large trees (&gt;24-inches dbh) may be removed at any time.</p> <p>3.3-D.3 Smaller trees (&lt;24-inches dbh) that are adjacent to larger trees (&gt;24-inches dbh) shall be removed first, one day (24 hours) before removal of adjacent large trees. This will provide an indirect disturbance that should be sufficient to cause bats roosting in adjacent larger trees to vacate the roost, without providing enough time for re-colonization of the roost.</p> <p>3.3-D.4 Snags shall not be removed without first being surveyed by a qualified bat biologist, 2-4 weeks prior to planned tree removal to determine whether bats are roosting inside the trees. If no roosting is observed, the snag shall be removed within one week following surveys. If bat roosting activity is observed, limbs not containing cavities, as identified by the bat biologist, shall be removed first, and the remainder of the tree removed the following day. The disturbance caused by limb removal, followed by a one night interval, will allow bats to abandon the roost.</p>	
3.3-E Construction of projects could interfere with wildlife travel routes and patterns.	LS	No mitigation is required.	LS
3.3-F Construction of projects could kill or injure other species (i.e., not Special Status Species) of wildlife.	PS	3.3-F.1 During all on-site activities, MMWD and its contractors shall take all precautions to avoid damaging or killing any form of wildlife, including snakes, lizards, small mammals, or birds, that becomes exposed during vegetation or soil removal. If such an animal is observed in the work area, the contractor shall move the animal out of harm's way, if possible, or request MMWD personnel to move the animal.	LS
3.3-G Adoption of non-system trails as part of the official trail system could result in increased use of those trails to the detriment of nearby wildlife populations.	LS	No mitigation required.	LS
<b>3.4 Other Resources</b>			
3.4-A Construction of projects included in the Draft Plan will require the use of heavy equipment (e.g. bulldozers, excavators, graders) to conduct grading and other earthwork. Construction emissions will include emissions from gas and diesel powered equipment and small particulates (i.e., dust) generated during grading operations.	PS	<p>3.4-A.1 MMWD will require its staff or contractors to implement, as appropriate, the BAAQMD's basic control measures for emissions of dust during construction, including:</p> <ul style="list-style-type: none"> <li>Water all dry active construction areas at least twice daily.</li> </ul>	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS	SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		<ul style="list-style-type: none"> <li>• Cover all trucks hauling soil, sand, and all loose materials, or require trucks to maintain at least two feet of freeboard.</li> <li>• Apply water as needed to all unpaved access roads, parking areas, and staging areas.</li> <li>• Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).</li> <li>• Enclose, cover, or water twice daily the exposed stockpile of excavated material.</li> <li>• Limit traffic speeds on unpaved roads to 15 mph.</li> <li>• Replant vegetation on fill slopes as soon as feasible.</li> <li>• Suspend excavation and grading activities when winds (instantaneous gust) exceed 25 mph</li> </ul>	
3.4-B	It is possible that projects included in the Draft Plan could damage or destroy archaeological and other cultural resources.	<p>PS</p> <p>3.4-B.1 The <i>Mount Tamalpais Area Vegetation Management Plan Draft EIR</i> (Leonard Charles and Associates, 1994) contains an Archaeological Sensitivity Map (Figure 21 of that Draft EIR) which identifies areas within the Watershed that may contain cultural resources. This map was prepared by a consulting archaeologist and is used by MMWD to check for archaeological resources prior to conducting Vegetation Management Plan projects. This same map will be used to guide future Draft Plan projects.</p> <p>3.4-B.2 Prior to constructing any project that would involve disturbance of earth outside road or trail beds or other areas previously disturbed when constructing the road and trail system. MMWD staff shall review Figure 21 of the <i>Mount Tamalpais Area Vegetation Management Plan Draft EIR</i>. If the project is located within an area that is mapped as "archaeologically sensitive," then the site shall be field surveyed by a qualified archaeological consultant who shall make recommendations and develop proposals for any procedures deemed appropriate to further investigate and/or mitigate adverse impacts to those resources.</p> <p>3.4-B.3 If cultural resources are discovered on a site during field surveys or during subsequent construction activities, all earthmoving activity in the area of impact shall be halted until a qualified archaeological consultant examines the findings, assesses their significance, and develops proposals for any procedures deemed appropriate to further investigate and/or mitigate adverse impacts to those resources.</p> <p>3.4-B.4 In the event that human skeletal remains are discovered, work shall be discontinued in the area of the discovery and the County Coroner shall be contacted. If skeletal remains are found to be prehistoric Native American</p>	LS

**TABLE 1 - IMPACT AND MITIGATION SUMMARY**  
(continued)

IMPACTS		SIGNIFICANCE BEFORE MITIGATION	MITIGATION	SIGNIFICANCE AFTER MITIGATION
			remains, the Coroner shall call the Native American Heritage Commission within 24 hours. The Commission will identify the person(s) it believes to be the "Most Likely Descendant" of the deceased Native American. The Most Likely Descendant would be responsible for recommending the disposition and treatment of the remains. The Most Likely Descendant may make recommendations to the landowner or the person responsible for the excavation/grading work for means of treating or disposing of the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98	
3.4-C	Most projects included in the Draft Plan involve grading that would not pose a significant risk of landsliding or slope failure. However, there are three types of projects that might require engineering to address unstable or expansive soils, including the placement of bridges, construction of crib walls or retaining walls where roads are very near a stream and there is not room to construct an adequate width of roadway, and construction of retaining walls at certain locations. In addition trail and road reroutes would need to be assessed by a geotechnical expert to make sure that they were not constructed in areas with unstable slopes and/or cause landsliding.	PS	3.4-C.1 MMWD will have a geotechnical engineer consult in the design of any road bridge project or retaining walls on the Watershed. Major trail and road reroutes will be reviewed by a geologist or geotechnical engineer. The recommendations of the geologist or geotechnical engineer regarding location, design, and/or construction of the trail or road will be included in the final trail or road reroute plan.	LS
3.4-D	If a project is near an existing residence, this construction noise can significantly affect the residents of nearby homes.	PS	3.4-D.1 Project construction in areas within one-quarter mile of a private residence shall be limited to the hours of 7:30 a.m. to 5:00 p.m. on weekdays. No work shall be allowed on Saturdays, Sundays, or holidays.	LS

## 3.0 ENVIRONMENTAL IMPACT ANALYSIS CHAPTER

## 3.0 ENVIRONMENTAL IMPACT ANALYSIS CHAPTER

This Chapter of the EIR includes an analysis of potential environmental impacts resulting from implementation of the Draft Plan. Each area or topic of environmental concern addressed in this EIR is discussed using the following format:

### A. Setting

This section includes a description of the existing physical and environmental conditions as regards the particular environmental factor under consideration (per *CEQA Guidelines* Section 15125). This section was developed after reviewing existing reports and mapping of the area, discussions with MMWD staff and other public agency staff, and field reconnaissance trips.

### B. Potential Impacts and Mitigations

This section begins with a list of the criteria that are used to determine impact significance. The criteria are based on the list of impacts typically considered significant as listed in the *CEQA Guidelines*. This section includes a description of any environmental constraints that could affect Draft Plan implementation and an analysis of all potentially significant impacts that would or could occur from implementing projects included in the Draft Plan (per *CEQA Guidelines* Section 15126a and b). For each potentially significant impact that is identified, there is a listing of feasible measures which can eliminate or diminish the identified impact. The section ends with a conclusion as to whether the impact is significant or not given mitigation measures incorporated in the Draft Plan and additional mitigation measures that may be recommended in this EIR.

### Initial Study

MMWD prepared an Initial Study for the Draft Plan; it is included in Appendix A of this EIR. This Initial Study was circulated to public agencies and interested parties as part of the Notice of Preparation. The Initial Study had two objectives. First, to notify agencies and interested parties that an EIR was to be prepared for the Draft Plan. Second, to assess potential environmental effects of the Draft Plan to a level which would focus this EIR on the potentially significant impacts. The Initial Study found that the Draft Plan would have potentially significant impacts in the areas of air quality, biological resources, cultural resources, geology and soils, hydrology and water quality, and noise. The potentially significant impacts in the areas of air quality, cultural resources, noise, and utilities and services can be reduced to a less than significant level by mitigation measures recommended in the Initial Study and reproduced in Section 3.4 below. Consistent with the Initial Study, this EIR focuses on the potentially significant impacts to water quality, plants, and animals.

## **3.1 HYDROLOGY AND WATER QUALITY**

### **A. Setting**

#### **1. Introduction**

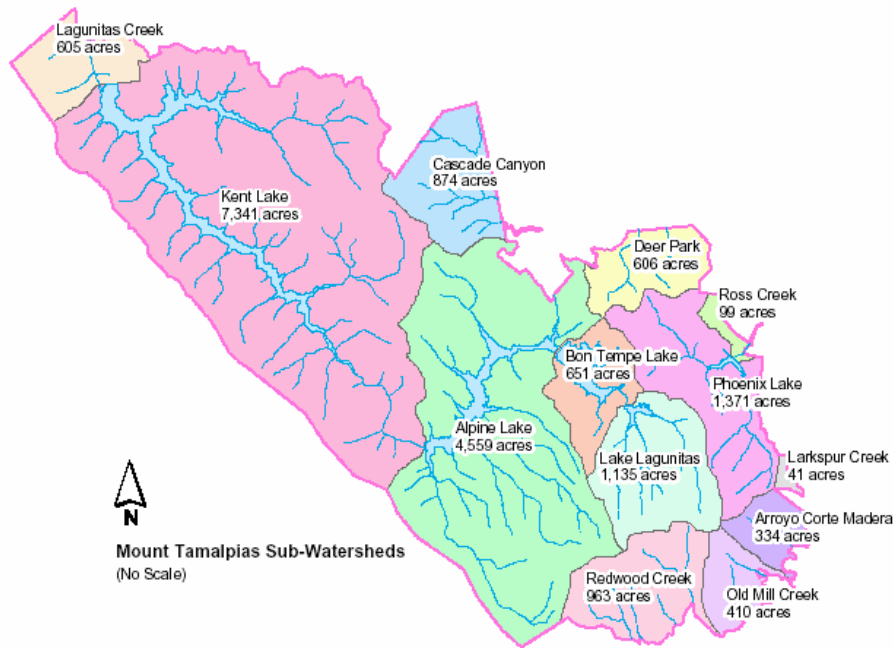
The Mt. Tamalpais Watershed lies within the Mediterranean climate region of California that consists of wet, mild winters and warm, dry summers. From 1979-1996, the average rainfall was 52 inches ranging from about 28 inches in 1987 to about 90 inches in 1983. Net runoff into the five Watershed reservoirs has been as high as 213,000 acre-feet in 1982-83 to as low as 3,000 acre-feet in 1976-77. The five reservoirs in the Watershed include Lake Lagunitas, constructed in 1872, and Phoenix Lake, constructed in 1905, which were a part of the system originally purchased in 1912 from Marin Water and Power Company. In 1918 Alpine Lake was constructed. It was enlarged twice, in 1924 and in 1941. Bon Tempe Lake was built in 1948. The final reservoir, Kent Lake, was constructed in 1953 and enlarged in 1982.

The Watershed (see Figure 7) consists of several sub-watersheds. Sub-watersheds of Lagunitas Creek (other than the small amount of watershed below Peters Dam on Kent Lake) drain to the District's four main reservoirs; these are called "interior sub-watersheds." Other sub-watersheds drained by streams other than Lagunitas Creek are considered "exterior sub-watersheds." The small area that drains to Lagunitas Creek below Kent Lake is also considered an exterior sub-watershed since runoff from that area does not flow into a District reservoir. The interior and exterior sub-watersheds are discussed in more detail below. The 13 sub-watersheds used for analysis in the Draft Plan are shown on Figure 8.

#### **2. Interior Sub-Watersheds**

The Watershed contains five reservoirs. The four main reservoirs (Lagunitas, Bon Tempe, Alpine, and Kent Lakes) are all in the Lagunitas Creek watershed. Tributaries of Lagunitas Creek, draining approximately 16,000 acres of the Watershed, drain into these four major Watershed reservoirs. When the reservoirs are full, they also overflow to the main Lagunitas Creek channel which transports the flows to the next reservoir downstream. The small Phoenix Lake reservoir is on Ross Creek, a tributary of Corte Madera Creek. For these creeks, MMWD is primarily concerned with water quality of the public water supply and with sediment input into the reservoirs. Erosion that leads to sedimentation of the creeks may cause increases in turbidity and nutrient loading in reservoirs, which in turn may increase costs for filtration and managing algae in reservoirs. Sediments carry with them naturally occurring heavy metals such as arsenic, nutrients such as phosphorus and nitrogen, and biological pathogens such as coliform, cryptosporidium, and giardia. Sediment transport to and deposition in reservoirs can provide an environment favorable to aquatic weeds (such as the recent growth of milfoil in Bon Tempe Reservoir), and algae. Algae, in concert with sediment, decrease water clarity, an indicator of the general health of a reservoir water body. Even if planktonic algae do not become established, benthic algae can continue to grow directly on deposited sediment.

**Figure 8**  
**Sub-Watersheds in the District Ownership and Their Acreages**



In addition to the reservoirs themselves, streams above and between reservoirs often contain important aquatic habitat and may support resident fish populations which could be adversely affected by this sedimentation. Sedimentation also decreases reservoir water storage capacity and reduces the usable life of the reservoirs. Sedimentation of the District's larger reservoirs is occurring at a very slow rate due to the relatively undisturbed condition of the Watershed vegetation (no recent large fires or logging). However, over time, capacity loss due to sedimentation could force the District to find other water sources in a region where water resources are scarce, costly, and subject to intense environmental scrutiny.

***Drinking Water Regulation***

The surface water from the Watershed is protected naturally from many kinds of contamination. However, the water is treated to remove viruses, bacteria, and other naturally occurring pathogens. Water treatment starts in the reservoirs, where MMWD seasonally aerates the water to maintain a proper oxygen balance. Next, the water goes to either the Bon Tempe Treatment Plant on Mt. Tamalpais or the San Geronimo Treatment Plant in Woodacre for further processing. Suspended matter is removed in clarifiers, microscopic particles are removed in deep-bed, multi-media filters, and bacteria and pathogens are inactivated by disinfectants. The water is then treated to control corrosion. Since passage of a voter referendum in 1972, fluoride has been added to reduce tooth decay.

Heavy metals, nitrate, and nitrite are regulated directly by water quality standards. The transport of nutrients is both directly and indirectly regulated. Phosphorus is not regulated, but its presence increases algal growth. Algal growth negatively impacts the secondary standard of odor via the production of chemical byproducts, and increases total organic carbon (TOC) levels. TOC is a directly regulated water quality parameter and is also the precursor to disinfection byproducts, another regulated parameter. Suspended sediment itself, measured as turbidity, is also a regulated water quality parameter and must be removed by treatment facilities.

### 3. Exterior Sub-Watersheds

Approximately 3,300 acres of the Mt. Tamalpais Watershed drain away from reservoirs. Watershed lands on the south and east slopes of Mount Tamalpais drain into the creeks that run through Muir Woods, Mill Valley, and Corte Madera. A sizable portion of the Watershed is in the headwaters of Corte Madera Creek (near Fairfax, San Anselmo and Ross). Portions of the northern and western areas of the Watershed drain directly into creeks that flow through San Geronimo Valley and Samuel P. Taylor State Park. All of these creeks contain salmon and steelhead habitat. The watersheds are shown on Figure 7. They are discussed in more detail below.

**Lagunitas Creek:** When the lakes are filled during the rainy season, excess flows flow out of Kent Lake and down Lagunitas Creek through Samuel P. Taylor State Park en route to Tomales Bay. At other periods, MMWD releases water from Kent Lake to the creek to maintain sufficient flows in the creek to support coho salmon, steelhead, and other fish and aquatic wildlife populations. The portion of Lagunitas Creek below Peters Dam drains directly to the creek and is not controlled by the District. This sub-watershed contains about 600 acres of the Watershed. The creek below Peters Dam supports both coho salmon and steelhead. Lagunitas Creek is noted for its coho salmon population, with some estimates indicating that Lagunitas Creek supports up to 10 percent of the remaining wild adult coho population in California. In recent years, small numbers of adult Chinook and Chum salmon have been observed spawning in the main stem of Lagunitas Creek and San Geronimo Creek. Lagunitas Creek has been listed as an impaired water body due to sediment, pathogens, and nutrients (San Francisco Bay Regional Water Quality Control Board 2002).

**Redwood Creek:** Redwood Creek has its headwaters on the southwest flank of Mt. Tamalpais. It drains about 960 acres on the Watershed. It flows through Muir Woods, private lands, and GGNRA before entering the ocean at Muir Beach. This creek supports both coho salmon and steelhead. In addition, California red-legged frogs inhabit the lower portion of the creek. The Redwood Creek multi-agency "Vision for the Future" calls for minimizing human caused erosion on fish and aquatic habitats. A comprehensive sediment budget for Redwood Creek shows that roads and trails within the Redwood Creek watershed contribute up to 25% of the total annual sediment budget (Stillwater Sciences 2003). Like Lagunitas Creek, most of the Redwood Creek watershed is under public ownership and managed as open space lands. The community of Muir Beach and Green Gulch Farm are in the lower portion of the watershed. Both MMWD and the National Park Service (NPS) have conducted erosion control projects on this creek to reduce erosion and sedimentation in the creek. A major multi-agency planning effort is underway to restore Big Lagoon at the mouth of the creek, with a major goal of improving habitat for salmonids. An EIS/EIR is currently be prepared for this project.



**Corte Madera Creek:** Corte Madera Creek has its headwaters in the Watershed and lands to the east of the Watershed. Within the Watershed it drains about 1,620 acres that are not impacted by a reservoir. An additional 1,317 acres of the Corte Madera Creek Watershed drain into Phoenix Lake. It contains four sub-watersheds: Larkspur Creek, Ross Creek (below Phoenix Lake), Cascade Canyon (San Anselmo Creek), and Deer Park Creek. It flows through the cities of Fairfax, San Anselmo, Ross, Kentfield, and Larkspur to an outlet in San Francisco Bay. This creek supports steelhead with rainbow trout in some of the upper drainages. Historically, Corte Madera Creek has also had some coho salmon but coho have not been observed in the creek since the 1980s, where they were observed in the tidally influenced segment of the creek. However, based on historic observations, the National Marine Fisheries Service (NMFS) has listed Corte Madera Creek as critical habitat for coho salmon. The watershed is heavily urbanized throughout the lower and middle portions, with publicly owned watershed lands in the upper part of the drainage. The tidally influenced segment is channelized for flood control, a portion being a concrete channel. The concrete channel poses significant problems for fish passage. Impacts to the creek are related to urban development (e.g., channelization, stabilized stream banks, loss of riparian corridor, urban runoff and water quality impacts, water wells and direct creek water withdrawals, fish passage barriers, etc.). Phoenix Lake, on Ross Creek, is the only reservoir in this watershed.

**Arroyo Corte Madera del Presidio:** This stream has its headwaters on the south face of Mt. Tamalpais and flows through Mill Valley to a bay outlet in Richardson Bay. It drains about 330 acres on the Watershed. The creek supports steelhead and, like Corte Madera Creek, has historically been known to support coho. Also like Corte Madera Creek, coho have not been seen in Arroyo Corte Madera for a number of years, but NMFS listed the creek as critical habitat for coho. The watershed is heavily urbanized in the lower and middle portions with open space lands in the upper part of the drainage. There are no reservoirs in the watershed.

#### **4. Sedimentation Potential**

The technical reports prepared for the Draft Plan (PWA 2002 and 2003) identified the amount of sediment that could be delivered to reservoirs and streams over the next twenty years from road and trail sources. To identify sedimentation sources, PWA walked and inspected all roads and trails. All existing and potential sediment delivery sites were identified and described. Sites, as defined in this assessment, include locations where there is direct evidence that future road- or trail-related erosion or mass wasting could be expected to deliver sediment to a stream channel. Sites of past erosion were not inventoried unless there was a potential for additional future sediment delivery. Road and trail segments exhibiting excessive erosion due to road location, maintenance practices, and other factors were noted in the field and are summarized in this report.

For each identified existing or potential erosion source, a database form was filled out and the site was mapped on a mylar overlay over a 1:8,000 scale aerial photograph. The database form contained questions regarding site location, the nature and magnitude of existing and potential erosion problems, the likelihood of future erosion, and recommended treatments to eliminate the site as a future source of sediment delivery.

The likelihood of future erosion, or *erosion potential*, and the predicted future sediment delivery volume were estimated for each major problem site or potential problem site. This potential future erosion volume was calculated under the assumption that no erosion control or prevention work would be undertaken. In a number of locations, especially at potential stream diversion sites, actual sediment loss could easily exceed field predictions. All sites were assigned a treatment priority or *immediacy* based on their potential or likelihood to deliver sediment to stream channels, the estimated future delivery volume, and other factors.

In addition to the database information, tape and clinometer surveys were completed on virtually all stream crossings. These surveys included a longitudinal profile of the stream crossing through the road prism, as well as two or more cross sections. The survey data were entered into a computer program that calculates the volume of fill in the crossing. The survey allows for an accurate and repeatable quantification of future erosion volumes (assuming the stream crossing was to wash out during a future storm), decommissioning volumes (assuming the road was to be closed), and/or excavation volumes that would be required to complete a variety of stream crossing upgrade and erosion prevention treatments (culvert installation, culvert replacement, etc.). The calculated amount of sediment that could be delivered to streams and reservoirs is shown in Table 2 for the 13 sub-watersheds.

Over 96% of this sediment would come from the Watershed's roads (approximately 179,500 cubic yards). The remaining approximately 4% would come from the trails (approximately 6,805 cubic yards). As would be expected, the largest sub-watersheds, Alpine and Kent Lakes, would be the biggest sediment producers on the Watershed. However, both of these sub-watersheds contribute less than the average sediment volume based on overall area (cubic yards per acre). Relative to size, the sub-watersheds on the south and east sides of Mt. Tamalpais that drain into Redwood Creek and Arroyo Corte Madera del Presidio are the biggest sediment producers.

**Table 2  
Sedimentation Potential**

Sub-Watershed	Acres	Volume from Road Erosion (cu.yds.)	Volume from Trail Erosion (cu.yds.)	Total Erosion (cu.yds.)	Erosion per Acre
Alpine Lake	4,559	39,072	1,591	40,174	8.9
Kent Lake	7,341	36,140	1,026	36,700	5.0
Phoenix Lake	1,371	26,049	1,014	26,724	19.5
Redwood Creek	963	24,300	1,526	25,110	26.1
Arroyo Corte Madera	334	15,965	301	16,136	48.3
Old Mill Creek	410	12,645	41	12,666	30.9
Lagunitas Creek	605	8,702	0	8,702	14.4
Lake Lagunitas	1,135	5,200	352	5,405	4.8
Deer Park	606	3,723	510	3,989	6.6
Bon Tempe Lake	651	3,111	232	3,282	5.0
Cascade Canyon	874	2,597	212	2,741	3.1
Ross Creek	99	1,037	0	1,037	10.5
Larkspur Creek	41	959	0	959	23.4
<b>TOTALS</b>	<b>18,989 acres</b>	<b>179,500 cu.yds.</b>	<b>6,805 cu.yds.</b>	<b>186,305 cu.yds.</b>	<b>9.8 cu.yds. per acre</b>

Note: sediment delivery volumes are for the next 20 years if no preventative treatments are performed.

Source: PWA, 2002 and 2003

## 5. Erosion Sites

The Draft Plan reports the following erosion sources that will be addressed by Draft Plan projects.

**Stream Crossings:** 372 road-related erosion sites were identified at stream crossings. 305 of these sites include crossings that have culverts. An additional 401 stream crossings were inventoried on trails. 18 of these crossings were classified as culverted crossings, 108 as fill

crossings (with or without armoring), 183 as ford crossings, and 79 as bridge crossings. Approximately 83,506 cubic yards of future road-related sediment could possibly be delivered to creeks or reservoirs from erosion at stream crossings, if the crossings were to wash out. An additional, approximately 1,456 cubic yards of sediment could possibly be delivered from the trail-related sites. The most common reasons that stream crossings fail is because they have been abandoned, are not properly maintained, or are undersized and more likely to plug. It is likely that all of the crossings will not wash out in the next twenty years, but over a longer period of time many will experience repeated episodes of partial erosion, stream diversion, or complete failure. The biggest problems can be expected during the peak storm events when District resources may not be enough or available on a continuous basis to maintain or clear all the culverts during the same storm.

360 (97%) of the road-related sites, and 206 (51%) of the trail-related sites will need some level of upgrade for the roads and trail network to be “storm proofed.” Examples of recommended preventative treatments include constructing rolling dips at critical locations next to the crossing to prevent creek diversions down a road or trail; installing larger culverts (with trash racks and erosion resistant downspouts where applicable) at natural grades to maximize flow and reduce plugging; installing or re-armoring fords; or changing the type of crossing (i.e., going from a ford to culvert, or from a culvert to a bridge).

**Ditch Relief Culverts:** 156 ditch relief culverts (DRCs) on roads were identified in the Watershed that have the potential to deliver sediment to a creek or reservoir. Gully erosion, in the inboard ditch or below the outlets, is the primary problem associated with these DRCs. The DRCs on the roads are expected to deliver approximately 2,067 cubic yards of sediment in the next 20 years. Only one DRC on a trail was identified with very minimal sediment delivery impacts.

150 (96%) of the road DRCs will need some level of upgrade for the roads to be “storm proofed.” Preventative treatments include installing additional ditch relief culverts, installing rolling dips, and outsloping roads, all of which act to reduce velocities within the inboard ditches. In some locations, additional treatments are also needed below the outlets to reduce erosion, and some of the existing ditch relief culverts may need to be replaced and installed deeper in the fill so they discharge in less erosive areas.

**Landslides:** 41 road-related landslides, and 11 trail-related landslides, were identified in the Watershed that have the potential to deliver sediment to a creek or reservoir. The primary landslide problems are associated with sidecast materials that are now beginning to show signs of failure. The road-related landslides are expected to deliver approximately 5,013 cubic yards of sediment to a creek or reservoir in the next 20 years. An additional, approximately 161 cubic yards could possibly be delivered from the trail-related sites.

Forty (98%) of the road landslides, and eight (73%) of the trail landslides, will need some level of upgrade for the roads and trail network to be “storm proofed.” Preventative treatment basically involves physical excavation of the sidecast materials and properly disposing of them. In a few cases, when a minimum road width needs to be maintained, a retaining wall, crib wall, or other engineered structure is necessary.

**“Other” Sites:** Approximately 3,427 cubic yards of sediment is estimated to be delivered to the Watershed in the next 20 years from 187 “other” road-related erosion sites. An additional, ~306 cubic yards could possibly be delivered from 50 “other” trail-related sites. The majority of the “other” erosion types are gully expansion and road or trail rilling, springs, and bank erosion. There were only a few unchanneled swales identified on the Watershed that can deliver sediment to a creek or reservoir. 180 (96%) of the road-related sites, and 44 (88%) of the trail-related sites, will need some level of upgrade for the roads and trail network to be “storm proofed.”

**Unnecessary Roads and Trails:** MMWD has identified all or parts of 8 system roads, 4 system trails, and a number of non-system routes that are unnecessary and will be decommissioned (see Section 1.6 which describes how these roads and trails were selected). Several of these roads and trails have significant erosion problems, so that decommissioning them would reduce future stream sedimentation.

**Persistent Erosion:** Roads and trails actively used and maintained represent a chronic, or persistent, type of erosion and source of sediment. Causes of persistent erosion include: (1) pulverizing and wearing down of the surface by vehicles, horses, bicycles or foot traffic; (2) cutbank erosion (due to natural causes and maintenance activities), (3) inboard ditch erosion (due to natural causes and maintenance activities), and (4) wet weather erosion on the roads and trails. When concentrated runoff runs down a length of unpaved road or trail, it becomes a sediment problem. The longer the uninterrupted length of road or trail, the more of a problem it becomes.

In the Watershed, 51.4 miles of road were identified that deliver sediment directly to a creek or reservoir or one of their tributaries. These road and trail segments are said to be hydraulically connected to the creek channel network. An additional 14.5 miles of hydraulically connected trails were identified on the Watershed. 50.6 miles (98%) of the hydraulically connected roads, and 12.5 miles (86%) of the hydraulically connected trails will need some level of upgrade before they are “storm proofed.” The road or trail segments not recommended for treatment will be fixed once the erosion problems at adjacent sites are fixed. Approximately 87,911 cubic yards of road-related sediment could be delivered to the creeks or reservoirs from persistent erosion over the next 20 years if no efforts were made to change road drainage patterns. An additional, ~3,904 cubic yards of sediment could be delivered from the trails.

Preventative treatments to control persistent erosion generally involve dispersing road runoff and disconnecting road surface and ditch drainage from the natural creek drainages with features like rolling dips, road outsloping or the addition of more ditch relief culverts. Since the trails are essentially little roads, the recommended preventative treatments are very similar to those recommended for roads.

Several road and trail segments in the Watershed will be difficult to treat to minimize their sediment delivery. These difficulties arise from inherent problems associated with poor road construction techniques, or in some cases, the location of a road or trail and its surroundings. These inherent problems make it difficult to disperse the runoff to a location where it won't enter a creek or tributary. In each of these instances, treatments are recommended that will cost-effectively reduce sediment delivery, but long-term minimization and prevention of both erosion

and sediment delivery may likely require rerouting, conversion, or decommissioning (or a combination of the three) of the problematic road or trail segment.

Appendix B of the Draft Plan contains a description of the various erosion problems for roads and trails for each of the 13 sub-watersheds. There is a table for each sub-watershed that describes the type of problem, the number of sites of each type in the Watershed, the number of sites or the numbers of miles (for persistent erosion) to be treated, the future yield if no preventative action is taken, the number of stream crossings with diversion potential, the number of streams currently diverted, and the number of streams likely to become plugged. Each site recommended for treatment is shown on maps included in the Draft Plan Appendix. More detailed data on the site and the recommended treatment are presented in the technical reports (PWA 2002 and 2003).

## **B. Potential Impacts and Mitigation Measures**

Based on CEQA Guidelines, a project would have a significant impact if it meets any of the following criteria:

- Violates any water quality standards or waste discharge requirements. (*Assessed in Impacts 3.1-A to 3.1-G.*)
- Results in substantial soil erosion or loss of topsoil. (*Assessed in Impacts 3.1-A to 3.1-F.*)
- Substantially depletes groundwater supplies or interferes substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the groundwater table level (e.g., the production rate of pre-existing nearby wells or springs would drop to a level which would not support existing land uses or planned uses for which permits have been granted). (*The Initial Study concluded the project would have a less than significant impact as regards this criterion.*)
- Substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river in a manner which would result in substantial erosion or siltation on- or off-site. (*Assessed in Impact 3.1-B to 3.1-F.*)
- Substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increases the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. (*The Initial Study concluded the project would have a less than significant impact as regards this criterion.*)
- Creates or contributes runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provides substantial additional sources of polluted runoff. (*The Initial Study concluded the project would have a less than significant impact as regards this criterion.*)

- Substantially degrades water quality or results in additional siltation of either surface or groundwater. (*The Initial Study concluded the project would have a less than significant impact as regards this criterion.*)
- Places housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood delineation map. (*The Initial Study concluded the project would have a less than significant impact as regards this criterion.*)
- Places within a 100-year flood hazard area structures which would impede or redirect flood flows. (*The Initial Study concluded the project would have a less than significant impact as regards this criterion.*)
- Exposes people or structures to significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. (*The Initial Study concluded the project would have a less than significant impact as regards this criterion.*)
- Is subject to inundation by seiche, tsunami, or mudflow. (*The Initial Study concluded the project would have a less than significant impact as regards this criterion.*)

## Project Impacts

### Impact 3.1-A      **Implementation of the projects included in the Draft Plan will reduce erosion and sedimentation of Watershed reservoirs and streams draining the Watershed.**

By implementing the projects recommended in the Draft Plan, MMWD would eliminate about 186,305 cubic yards of sediment (about 179,500 cubic yards from roads and 6,805 cubic yards from trails) from reaching Watershed streams over the next twenty years. By eliminating this amount of sedimentation, MMWD would improve the water quality of the streams by decreasing turbidity and the transport of heavy metals, undesirable nutrients, and pathogens. These actions would improve the water quality within the Watershed reservoirs as well as the water quality of streams that drain off the Watershed, thereby benefiting fish and other aquatic species dependent on good water quality. The reduction in sedimentation would also reduce sediment buildup in the reservoirs thereby lengthening their useful life. The reduction would also reduce sedimentation of the streambeds of area streams.

Closure of the roads and trails recommended for closure, including decommissioning of certain roads and trails would basically eliminate use of these roads and trails as well as address specific erosion problems. Rerouting eroding trail sections would reduce erosion from those trail sections. This would reduce sedimentation to area streams. All these long-term impacts are **beneficial** impacts of the Draft Plan. The long-term impacts do not require any mitigation measures. The overall goal of the Draft Plan along with the mitigations listed above meet or exceed the goals and water quality objectives set forth in the *Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin* (hereafter called the Basin Plan). Subsequent impact

discussions assess the short-term water quality impacts associated with the actual construction of these restoration projects.

Table 3 lists the number of recommended treatments included in the Draft Plan for roads while Table 4 shows the recommended treatments for trails. The locations for these repairs are shown on Figures 3 and 5. All of these recommendations may not be implemented since .



**Table 3  
Recommended Treatments Along Roads**

<b>Treatment</b>	<b>No. of Treatment Sites</b>	<b>Treatment Rationale</b>	<b>Treatment</b>	<b>No. of Treatment Sites</b>	<b>Treatment Rationale</b>
Install critical dip	201	To prevent stream diversions	Outslope road and remove ditch	230	Outslope and remove ditch along 79,909 feet of road to improve road surface drainage
Install culvert (CMP)	40	Install a CMP at an unculverted fill	Outslope road and retain ditch	44	Outslope and retain ditch along 7,423 feet of road to improve road surface drainage
Replace CMP	255	Upgrade an undersized CMP	Install rolling dip	1,714	Install rolling dips to improve road drainage
Install bridge	5	Replace a culvert crossing with a bridge,	Install cross-road drain	4	Install cross-road drains to improve road drainage
Armor bridge abutments	6	Armor bridge abutments using 150 cu. yds. of rock armor	Remove berm	19	Remove 3,829 feet of berm to improve road surface drainage
Install wet crossing	18	Install 3 fords and 13 armored fill crossings using 135 cu. yds. of rip-rap	Install ditch relief culvert <sup>1</sup>	240	Install ditch relief culverts to improve road surface drainage
Excavate soil	177	Typically fillslope & crossing excavations; excavate a total of 20,027 cu. yds.	Rock road surface	354	Rock road surface using 8,107 cu. yds. of rock at 184 rolling dips, 37 DRCs, 82 stream crossing culverts and replacements, and 51 other site-specific locations
Install culvert downspout	73	Installed to protect the outlet fillslope from erosion	Inslope road	4	Inslope 700 feet of road to improve road drainage
Install trash rack	29	Installed to prevent culvert from plugging	Remove ditch	2	Remove 230 feet of ditch to improve road surface drainage
Clean and/or repair CMP	12	Remove debris and/or sediment from CMP inlet	Cut or clean ditch	30	Cut or clean 3,630 feet of ditch
Armor fill face	144	Rock armor to protect outboard fillslope from erosion using 1,320 cu. yds. of rip rap	Construct engineered fill	7	Road failures on paved county road requiring retaining walls
Install flared inlet	9	Installed to increase CMP capacity	Other	37	Miscellaneous treatments

**Table 4  
Recommended Treatments Along Trails.**

<b>Treatment</b>	<b>No. of Treatment Sites</b>	<b>Treatment Rationale</b>	<b>Treatment</b>	<b>No. of Treatment Sites</b>	<b>Treatment Rationale</b>
Critical dip	16	Install critical dips to prevent stream diversions	Outslope trail and remove ditch	5	Outslope and remove ditch along 830 feet of trail to improve trail surface drainage
Replace CMP <sup>1</sup>	2	Upgrade an undersized CMP	Outslope trail and retain ditch	1	Outslope and retain ditch along 15 feet of trail to improve trail surface drainage
Wet crossing	36	Install 8 fords and 31 armored fill crossings using 47 cu. yds. of rip-rap	Install rolling dip	639	Install rolling dips to improve trail drainage
Install bridge	14	Replace a culvert crossing with a bridge	Install cross-trail drain	125	Install cross-trail drains to improve trail drainage
Raise bridge	2	Raise bridge to allow passage of sediment and debris	Cut or clean ditch	1	Cut or clean 15 feet of ditch
Excavate soil	63	Typically fillslope & crossing excavations; excavate a total of 1,948 cu. yds.	Re-route trail	9	Re-route 2,325 feet of trail away from streams
Rock trail surface	3	Rock trail surface using 6 cu. yds. of rock at 3 site specific locations	Install stairs	2	Install 215 feet of stairs to minimize erosion on steep trail sections
Armor fill face	5	Rock armor to protect outboard fillslope from erosion using 12 cu. yds. of rip-rap	Other	19	Miscellaneous treatments

MMWD may elect not to conduct a specific action if the environmental effects of constructing said project would outweigh the sediment reduction that would be realized. In addition, many sites are on County- or State-controlled roads where MMWD does not have the ability to require that recommended actions be implemented

**Impact 3.1-B Construction of projects within stream channels can result in the release of sediments to the affected stream.**

The Draft Plan includes several classes of projects where the work would be done directly in the stream channel. Many road and some trail crossings of streams are across fill that has been placed in the stream. Usually a culvert(s) has been installed through the fill crossing to allow water to pass through the fill to the channel downstream of the crossing. Roads approaching the crossings are often built near or adjacent to the stream channel. Potential problems involved with such crossings include:

- **Inadequately-sized culvert** A culvert may be inadequately sized to carry peak flows generated by the 100-year storm event. While the culvert may be adequate to carry normal peak flows, if it is not big enough to carry these peak flows that occur during major storms, then runoff can overtop the fill causing it to erode and potentially fail completely. In the latter case, all of the fill crossing can wash downstream and add a substantial amount of sediment to the stream. Alternatively, runoff can overtop the fill bank and run down the road or trail, erode sediment from the road or trail, and create gullies where the runoff finds a location to reenter the stream channel. Such gullies can deliver major amounts of sediment to the stream (locations where this phenomenon can occur are classified as crossings with "diversion" potential). To remedy this problem, the Draft Plan identifies all locations with inadequately sized culverts and proposes to replace them. Doing so requires removal of the fill, taking out the old culvert(s), installing a new culvert, and replacing and recompacting the fill. This work can result in a number of potential impacts, including:
  - If earth falling into the stream channel while excavating and replacing fill materials is not removed, it would wash down the stream during the next rainy season.
  - If new fill slopes are not revegetated, armored, or otherwise protected, they would be subject to erosion during the next rainy season, and the eroded sediment would wash into the stream.
- **Incorrectly placed culverts** A culvert may be incorrectly placed within the fill. It may not be oriented at the correct angle to the streamflow or it may be too high in the fill (i.e., not placed at the elevation of the streambed). Incorrect placement can result in plugging of the culvert which can result in the flows overtopping the fill bank, thereby causing erosion and possibly failure of the fill crossing. Culverts that are too high in the fill result in ponding and inadequate drainage. Many of these incorrectly placed culverts are also too small to transport peak flow. Similar to the description above, these culverts would be replaced with new culverts that are correctly placed to maximize streamflow and minimize the potential for plugging. Replacing the culverts would result in the same potentially significant impacts identified above under inadequately-sized culverts.
- **Unculverted stream crossings** Some road stream crossings (generally crossings of smaller ephemeral channels) are fill crossings that do not include a culvert to pass the flow through the fill. At these locations, runoff flows across the top of the crossing to the channel downstream. These crossings are a source of ongoing erosion plus they have the potential of failing completely during a major storm event. The Draft Plan identifies locations where such failure could occur and recommends replacing the crossings with either new fill crossings that include a culvert or with armored wet crossings or fords (i.e., placing rock to allow runoff to cross the road through a rocked-section; recommended for 16 locations). Repairing these crossings would have the same potentially significant impacts as identified

above under inadequately-sized culverts. Armoring of wet crossings would not be expected to cause significant erosion.

- **Trail stream crossings** Many of the trail stream crossings are fords or fill crossings. The Draft Plan identified 401 trail stream crossings, including 18 culverted crossings, 1,088 unculverted fill crossings, 79 bridges, 183 fords, and 44 armored fills. Most crossings were fords, armored fills, or bridges, which are the preferred types of trail stream crossings. Nevertheless, 206 of these crossings have been recommended for treatment. Treatment of trail problems is generally a lower priority than road crossings because they would generate a fraction of the amount of sediment as roads would. The major problem is crossings with insufficient cross sectional area to allow peak flows to pass across armored fills; stream crossings with diversion potential; and crossings with culverts which are likely to plug. Treatments will include excavating sufficient area and placing armor for crossings with insufficient cross sectional area; constructing critical (rolling) dips at locations where diversion could occur; and/or installing bridges. With only one or two exceptions, culvert installation or replacement was not recommended. These trail crossing projects could result in erosion when taking out old culverts and removing fill, excavating the cross sectional area and placing the armor, and installing bridges. Bared soil resulting from these actions could erode and result in stream sedimentation.

Of 372 road stream crossings on the Watershed, 305 have culverts, 57 are unculverted fill crossings, 6 are ford crossings, and 3 have bridges. The Draft Plan recommends new culverts for 40 ( of the crossings. New culverts would be designed to transport the 100-year design storm flows. Culverts would be installed at the natural channel gradient to maximize the sediment transport efficiency of the pipe and ensure that the culvert outlet will discharge on the natural channel bed below the base of the road fill. Debris barriers and flared culvert inlets will be installed to prevent culvert plugging. Critical (rolling) dips will be developed on the road so that runoff coming down the road would be diverted to the stream channel and to ensure that streamflows (in case unforeseen plugging did occur and the stream overtopped the fill bank) would not flow down the road.

In 5 locations, the Draft Plan identifies the need for a bridge crossing for a road rather than constructing a fill crossing with culverts. In these locations, the fill and culvert would be removed, and a bridge installed. Unless the bridge is appropriately engineered and constructed. Its construction could result in erosion at the streambanks where the abutments are constructed, though the Draft Plan does call for armoring all new bridge abutments. This is a potentially significant impact. In addition to the projects that would be conducted at stream crossings, the Draft Plan recommends actions at a number of other potential sediment-generating locations. These are summarized below.

- **Road-caused landslides** In 41 locations, the Draft Plan identifies road-caused landslides on streambanks. These landslides have the potential to transport 5,013 cubic yards of sediment to streams over the next 20 years. In addition, there are several trail landslides occurring mainly where trails are aligned along an old roadbed (with the potential of delivering 161 cubic yards of sediment). These landslides are the result of grading a road near a stream where the materials cast to the side of the road during grading result in a bank below the road that is unstable. Over time, these landslides do or could fail and deposit large amounts of sediment directly into the creek. The Draft Plan recommends

removal of the potentially unstable material. Where necessary to maintain adequate road width, it may be necessary to construct engineered retaining walls with compacted earth behind the walls to provide a stable roadbed. Generally, the Draft Plan recommends that the slope be recontoured to a more stable slope and where needed that armoring of the face be provided. Removal of the unstable material could result in some earth being deposited in the stream channel. The new bank produced once the unstable materials are removed could erode or, if too steep, fail. These are potentially significant impacts. If the retaining walls are improperly constructed, they could fail unleashing sediment.

- **Road fills in stream channels** The Draft Plan identifies several bank erosion sites which are locations where road fills impinge on the stream channel. At these sites, erosion of the lower part of the fill occurs during normal to high flows of the stream. This process causes direct sedimentation plus destabilizes the road which could then fail. The recommended treatment is armoring of the banks with rock after removal of some of the fill (in some locations). Filter fabric is also recommended in some locations. This treatment is not expected to cause significant erosion other than the potential dislodgement of soil into the channel as the rock is being placed. Fill slopes that show signs of pending failure and that would enter a creek or reservoir will be removed before they fail if the remaining width allows continued safe passage. If additional width is needed, the District will first consider cutting into the inside bank rather than trying to extend the fill. The District will not sidecast material to rebuild fillslope failures, because the added material will end up in the creek or reservoir. In these cases a crib wall or other reinforced retaining structure will be used. If necessary, a geotechnical and/or structural engineer may be consulted in the design solution. In cases where the eroding outboard side of the roadbed would not slide into a creek or reservoir, and there is sufficient room for vehicles, the area should not be disturbed unless it creates other safety or environmental issues.

In general, heavy equipment will perform most of the significant erosion prevention and erosion control work along road networks, and small equipment (such as bobcats) and hand labor will perform most of the work along the trail networks. On the Watershed, heavy equipment is limited to roads, those trails that were initially constructed as roads, and a few other trails where access is not problematic. Many trails are accessible using smaller equipment, but the majority of erosion sites on trails on the Watershed can be treated using hand labor only. Hand labor treatments may include excavation of soils at stream crossings, hand digging of trail drainage structures such as rolling dips, installing cross trail drains, outsloping, and rock armoring at armored fills and fords. Hand labor erosion control treatments are also often needed on sites where heavy equipment has been used to perform decommissioning. Hand labor is used to stabilize and revegetate soils exposed by heavy equipment operations. Work can include mulching, seeding and planting.

The potential exists for post-excavation erosion to occur when working at stream crossings or on sites adjacent to the streambed. The total volume of post-excavation erosion is small in comparison to the volumes being prevented from eroding by removing the fill from stream systems and stabilizing sites on or near the stream channel. However, new information on the effects of turbidity and suspended sediment on the survival of young salmonids has raised concerns about the surface erosion that may occur during the first winter after the work is completed. This erosion and the resulting stream sedimentation is a ***potentially significant adverse impact***.

## **Mitigation Measures**

The Draft Plan includes detailed recommendations of the work to be done at each project site. The projects are all designed to allow flow of the 100-year design storm in the natural channels while preventing culvert plugging and/or diversion onto roads and trails. The Draft Plan also contains a description of the Best Management Practices (BMPs) that will be used when constructing the projects (see Chapter 3 of the Draft Plan). These BMPs include design guidelines for

- road grading
- rolling dips and waterbars
- culvert sizing and placement
- debris control structures
- energy dissipaters
- fords

The Draft Plan includes design standards for maintaining District roads and trails and for locating and constructing new road and trail sections. The District will reconstruct creek crossings using modern standards (see sections 3.1 and 3.2 of the Draft Plan). Whenever possible, the crossings would be upgraded to handle the anticipated 100-year flood flows and the anticipated traffic types and volumes. This may require excavating the entire older crossing down to the original channel bed before placing a new crossing. In other instances this may mean installing a culvert where none existed, replacing a culvert with a constructed ford or replacing a culvert with a bridge.

The Draft Plan also includes a full complement of BMPs that will be used to protect environmental resources. These measures are listed below. While some of these measures do not apply specifically to this impact, all Draft Plan BMPs for environmental protection are listed here, and then will be referenced where appropriate in subsequent impact assessments.

The BMPs in the Draft Plan provide a good framework for addressing the potential erosion and sedimentation impacts associated with projects in or near streams. Some additional mitigation measures or BMPs are recommended to clarify how the BMPs included in the Draft Plan will be implemented. It is intended that the RWQCB as well as other agencies can use the listed BMPs when conducting their Water Quality Certification for needed permits.

The additional mitigation measures were derived from a number of sources including:

- MMWD's already approved project on Redwood Creek (*Redwood Creek Watershed Sediment Control on Marin Municipal Water District Lands*, California Department of Fish and Game, Notification No. 1600-2004-XXXX-3);
- BMPs developed by GGNRA for restoration work done in Redwood Creek (from Carolyn Shoulders, Natural Resource Specialist, GGNRA);

- The Department of Fish and Game's *Proposed Mitigated Negative Declaration for the 2003 Fishery Restoration Grants Program for Del Norte, Humboldt, Marin, Mendocino, Monterey, San Luis Obispo, Santa Cruz, Siskiyou, Sonoma, Trinity, and Ventura Counties and Required Agreement Regarding Proposed Stream or Lake Alteration*. (includes Appendix B: *Mitigation Measures, Monitoring and Reporting Program, 2003*);
- The *California Salmonid Stream Habitat Restoration Manual*, (Gary Flosi et al, third edition, prepared for the California Department of Fish and Game);
- *California Storm Water Best Management Practice Handbooks – Construction Activity* (Camp Dresser & McKee et al, for Storm Water Quality Task Force, 1993)

The following listing of mitigation measures and BMPs shows the measures already included in the Draft Plan in *italics*; the additional EIR-recommended mitigations or clarification are shown in plain texts (i.e., not in italics). Again, all conditions are presented here even though many of these conditions do not necessarily apply to the impact under discussion. Future impact discussions will reference this list of conditions.

### **Mitigation Responsibility**

- 3.1-B.1 For each project or a related group of projects to be done sequentially by the same contractor, MMWD will identify which mitigation measures and/or Best Management Practices (BMPs) will be required for that project. The measures/BMPs will be described using a checklist identifying where and when the measures are to be done. MMWD staff will visit the site with the contractor to identify and, if necessary, flag where the measures/BMPs are to be done. The mitigation measures/BMPs shall be included in construction contracts with outside contractors and/or in construction plans for MMWD staff. MMWD staff shall be responsible for monitoring all work to ensure satisfactory compliance. *Construction sites will be monitored during and after the completion of the activities to ensure there are no unintended or undesirable environmental effects resulting from the project. When there are special status species populations nearby, the area will be monitored more closely by the District during and after project completion. The level and duration of monitoring will be determined by the District on a case by case basis to ensure that there are no accidental environmental impacts and that all necessary mitigation measures are fully implemented.*

### **Stream Protection**

- 3.1-B.2 *Where needed, temporary diversions around the work area will be accomplished using a small cofferdam and flexible pipe. For wet crossings, excavations must begin at the downstream end of the site and is recommended for dry sites worked on near the end of the dry season. When a dam is used, sufficient water will be allowed to pass downstream to maintain aquatic life below the dam. Any equipment work within the stream channel shall be performed in isolation from the flowing stream. If there is any flow when the work is done, the contractor shall construct coffer dams upstream and downstream of the excavation site and divert all flow to below the downstream dam. The coffer dams may be constructed with clean river gravel or*

sand bags, and may be sealed with sheet plastic. Sand bags and any sheet plastic shall be removed from the stream upon project completion. Clean river gravel may be left in the stream, but the coffer dams must be breached to return the stream flow to its natural channel. Standing water, however, may remain in work areas due to the high water table at some sites. The creek flow must remain free of turbidity during grading and all other construction activities. The District and its contractor will be responsible for preventing loose soil from entering flowing water during grading. Methods for preventing turbidity may not prevent fish passage and may not block off a portion of the creek whereby fish could be trapped. The use of silt fencing or similar actions that require trenching into vegetated areas that would otherwise remain undisturbed is generally not preferred. *Aquatic organisms in the area filled by the dam will be relocated to a secure section of stream prior to work.*

- 3.1-B.3 The contractor will establish an outflow point for the dewatering pipe at a downstream location in the creek, even if flows are very low. The outflow point will be approved by the District prior to installation. The contractor will be responsible for maintaining the dewatering system and must use a material for coffer dams, such as sandbags, that will not cause fish to become trapped or caught or pose any other potential hazard to the fish. The contractor will conduct any maintenance or reinforcement or take any additional measures necessary to ensure that the dewatering system functions to limit turbidity. The contractor will take additional measures to ensure that excessive turbidity is not caused when the coffer dams are removed.
- 3.1-B.4 *Sufficient erosion control will be in place during and after work to insure that sediment does not enter the stream channel and that there is no increase in stream turbidity levels resulting from construction. Disturbance of streamside vegetation will be the minimum necessary to complete operations. Other restrictions may be applied for specific sites.*
- 3.1-B.5 The number of access routes, number and size of staging areas, and the total area of the work site activity shall be limited to the minimum necessary to complete the restoration action.
- 3.1-B.6 Because construction work in streams will be conducted during a low flow period when turbidity can impact salmonids, the District and its contractor must exercise extreme care in all actions - even for such actions as walking in the stream – to prevent sediments from being stirred into the creekflow. Operators conducting in-stream work must take care to reduce any possible impacts to streamside vegetation, overhanging limbs, surface gravel, or erosion, or any other environmental effects that are not the direct result of project actions required to implement this job. In particular, all best management practices shall be followed to prevent turbidity or other water quality impacts to either localized work areas or downstream areas where work is not being conducted.
- 3.1-B.7 Any equipment entering the creek will keep movement in the creek and entrances and exits to and from the creek at an absolute minimum. The contractor will be



responsible for pre-planning the movements of any equipment into the creek to reduce these movements.

- 3.1-B.8 To prevent construction debris from entering the creek, appropriate best management practices set forth in the California Storm Water Best Management Practice Handbooks will be employed. In upland work areas, barriers will be placed between the construction area and the creek to prevent construction debris or surface runoff from entering the creek. *The District will install temporary erosion control measures, such as silt fences, erosion control matting, wattles or hay bales, to prevent transport of sediment and other wastes off the project, storage or staging areas that could possibly enter a creek or reservoir.* Erosion control will be in place by October 30. *Furthermore, the District will control dust at the project, storage or staging areas to prevent the transport of such material into a creek or reservoir. Imported wattle, hay bails, and matting used for erosion control should be certified "weed free."*

*Mulches, jute netting, and/or native plant materials will be used wherever bare ground can erode into a creek or reservoir. This includes all excavated fillslopes above these waterbodies and all excavated stream crossings. Weed free straw (3,000 to 5,000 lbs/acre) is one of the most common products used for mulch, but there are other products available as well. On steep slopes or in windy areas, mulch will be tacked, punched or secured to the ground. Imported mulch should be certified weed free. Mulched sites will be mapped and monitored for nascent weed populations.* Rather than random scattering of debris, vegetative material will be collected and concentrated on slopes adjacent to live streams and other locations where fine sediment may be mobilized and enter the stream system. If there is not enough on-site vegetative debris to achieve the desired level of ground cover, excess vegetation from nearby restoration sites may be utilized or additional materials may be imported to the site. Materials will be selected to comply with MMWD requirements to minimize introduction of exotics and interference with re-establishment of native forest species. The Contractor will be required to assist in the transport of such materials from their point of delivery to the actual job site where they will be used. Site-specific conditions both on the finished slope and within the buffer will affect the amount of ground cover actually needed to achieve the goals of reducing downstream turbidity and suspended sediment. Where particularly vulnerable species or habitat are located immediately downstream, or where highly erodible soils are found, the guidelines shall be adjusted to favor more complete surface erosion control. Conversely, some areas may allow relaxing of guidelines, for example where buffer zones have atypically high sediment trapping efficiency due to topographic benches or particularly dense understory and litter accumulations or where excavated materials contain large coarse fragment content that would readily form an erosion pavement. These guidelines will be used and adapted as needed to actual field conditions to insure that fine sediment is prevented from entering the stream systems as much as is reasonably possible.

- 3.1-B.9 Potential pollutants (e.g., fuels, etc.) will be stored with proper containment and outside of areas where contact with stormwater runoff or creek waters could occur.

Contractors will be held responsible for proper handling of fuels and other pollutants to ensure there is no spillage during refueling or other handling procedures.

- 3.1-B.10 All bridge abutments shall be designed by a civil engineer. Abutments will be armored and otherwise protected as recommended by the designing engineer.

### **Construction Timing and Coordination**

- 3.1-B.11 *All work activities will be timed to avoid, or minimize, the environmental impacts of those work activities. Work in a stream crossing will be done during the dry season to help protect water quality and fisheries. Work around streams will be confined to the period of April 15 through October 15 or the first rainfall. In-water work will cease on or before October 15 of any year.*

- 3.1-B.12 Any disturbed banks shall be fully restored upon completion of construction. Revegetation shall be done using native species. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in the latest version of the California Salmonid Stream Habitat Restoration Manual.

- 3.1-B.13 Planting of seedlings shall begin after December 1, or when sufficient rainfall has occurred to ensure the best chance of survival of the seedlings, but in no case after April 1.

- 3.1-B.14 *Prior to any work, the construction crew(s) will be informed of: (1) all necessary environmental protection measures; (2) the location of known special status species populations; (3) the location of any environmentally sensitive habitats; (4) the location of invasive exotic weed species that could infest the project site, and (5) all protective measures included in the project to minimize accidental environmental impacts.*

- 3.1-B.15 *All construction sites will be signed and noticed that a construction project will occur or is in progress. The notice will describe, as appropriate or necessary, the type of work, whether or not the work will result in a road, trail or area closure, the duration of the work activities, when the road, trail or area would be reopened (if applicable), and include contact information for the public so they can get more information on the project.*

### **Construction Staging and Storage Areas**

- 3.1-B.16 *All construction staging and storage areas shall be identified prior to beginning construction. Whenever possible, the staging and storage areas should be located in areas that have minimal natural resource value like parking areas, roadbeds, and trail beds. In all cases, the staging and storage areas should be returned to, at a minimum, their pre-construction condition. If these areas are associated with a decommissioning or restoration project, they could be included in the restoration also.*

### **Minimizing Disturbance**

- 3.1-B.17 *Whenever possible, the District will confine its work activities within the alignment of an existing road or trail and avoid impacts to previously untrammeled areas. In most cases, the older, high maintenance insloped routes can be converted to low maintenance outsloped routes without disturbing adjacent areas. When appropriate, such as when special status species populations are in the vicinity of the project, staging or storage areas, the construction crews will be notified of the special status species and the requirement to protect them. If necessary, the sensitive areas will be clearly marked or fenced during the duration of the project to minimize accidental impacts.*
- 3.1-B.18 *Only the areas that truly need to be disturbed will be disturbed. Ditches and cutbanks should be left undisturbed unless they are identified as specific areas needing work. Construction crews will be briefed on what is not to be disturbed on site prior to the commencement of work. When environmentally sensitive habitats or special status species populations are involved, a protective barrier or signage will be installed that indicates the limits of construction and prohibits any work in areas not to be disturbed. In all cases, no sidestepping during maintenance, reconstruction or decommissioning work shall occur, especially near streams.*

### **Disposal of Spoils**

- 3.1-B.19 *Placement of excess materials resulting from project activities will be identified in advance. Spoils will be placed in stable areas preferably in areas planned for long-term rehabilitation (former quarry sites, rock terraces near dam sites etc.). Fill material removed from stream crossings and other sites shall be placed onto a road, landing, or skid road, inboard of the toe of the cut and against the existing cutbanks, but shall not exceed existing cutbank height. Fill shall be placed against cutbanks in such a manner that will prevent concentration, containment, or diversion of surface runoff. Fill material shall be placed such that surface runoff cannot enter the stream between the cutbank and the emplaced fill. The finished grade shall be a free draining surface. All berms, tracks, and other surface irregularities shall be smoothed. Fillsites shall not trap or pond surface water, and must create free draining surface flow. Brush, trees and other organic debris (including but not limited to logs and rootwads) encountered or removed during excavation and clearing of fillsite areas are to be distributed over the finished surface in accordance with the post-excavation erosion control guidelines. The fillsite shall be revegetated as warranted.*

### **Revegetation**

- 3.1-B.20 *The District will seek to allow natural reestablishment of native vegetation at construction sites, taking into account the following when determining site-specific revegetation strategies:*
- *Potential for natural recovery of the vegetation;*
  - *Potential for expansion and establishment of invasive, exotic weed species;*
  - *Availability of local seed and plant stock; and*

- Available information on special status species and environmentally sensitive habitats in the area.

- 3.1-B.21 *Whenever possible, the District will reseed disturbed sites by redistributing topsoil and surrounding vegetative litter in the final site dressing. Seeding with imported germ material may be appropriate where extensive areas are disturbed or the native seed bank is degraded. Seed material collected from the Watershed will be used to the fullest extent possible. Seed mixes should be site specific, with species composition drawn from the surrounding plant community. Where rapid establishment of vegetative cover is deemed necessary, seed mixes should be restricted to sterile, annual grass species. Fertilizers and nitrogen-fixing cover crops should not be used, as such “soil enhancers” because they can facilitate invasive, exotic weed establishment.*
- 3.1-B.22 *Newly seeded areas should be marked on the ground or mapped and protected from disturbance during the germinations season. These areas should also be closed to foot, horse and bicycle traffic. Vehicles should not be parked or driven over seeding weed populations. If necessary, a temporary or permanent access barrier or fence may be installed to prevent damage.*
- 3.1-B.23 *Following seeding planting perennial species, shrubs and trees, may be appropriate at specific project sites. While these plants ultimately provide better erosion control, they take longer to establish. Species selection should reflect the surrounding plant communities, and plant material should be gathered from the Watershed. To the fullest extent possible, root masses, bulbs, and corms excavated during construction should be preserved and replanted on the project site as part of the final dressing. In some cases, extra care may be needed for the newly planted perennial species to protect them from deer, summer drought and other plant species which may out compete them for sun, water and nutrients.*
- 3.1-B.24 *Topsoil removed from the project area will be stored for its return to the disturbed site upon project completion. Special care will be applied to any soil supporting special status plant species to minimize excessive disturbance of the soil during its removal, storage and return to the project area.*

### **Soil Recomaction**

- 3.1-B.25 *Soil will only be compacted to the extent necessary to reduce any surface erosion that may occur in the first heavy rainfall.*

### **Maintenance Work**

*Maintenance of roads and trails is essential. It helps protect the system, minimizes erosion and helps protect the environment. Maintenance needs to be performed on road and trail surfaces, cutbanks, fillslopes, drainage structures (especially culverts) and erosion control features. The District proposes to implement the following, as practicable and appropriate, to avoid adverse impacts associated with maintenance work.*

- 3.1-B.26 *Seasonal Closures. Minimize traffic loads on sensitive roads during the rainy season by seasonally or temporarily closing the roads or trails to certain uses.*
- 3.1-B.27 *Inspections. The District will regularly inspect, before the rainy season, all stream crossings (including culvert trash racks and erosion control features), inboard ditches, ditch relief culverts, rolling dips and waterbars to be sure they will function properly.*
- 3.1-B.28 *Road Grading. The District will grade roads only when needed to maintain an acceptable driving surface and retain proper drainage. The District will grade only when road surfaces are slightly damp so the graded materials get properly mixed, compacted and bound with the underlying materials.*
- 3.1-B.29 *Ditch Grading. Ditches will be graded only when and where necessary. Small plants and annual grasses will be left in ditches if they do not block water movement. This vegetation slows runoff velocities, helps prevent scour and filters out sediments. Often, nothing more than shovel work is necessary to maintain drainage ditches.*
- 3.1-B.30 *Culverts. The District will continue to mark all its culverts with coded signs that indicate where the culvert is located, and in certain cases, their diameter and relative inspection needs (based on its likelihood of plugging or history of problems). The District will continue to maintain a master file of all the culverts and their attributes for quick reference. This file will be regularly updated and maintained to maximize its usefulness. The District will also inspect culverts during periods of high runoff to clear them of debris that may cause plugging. The District will also fix culvert problems as soon as practicable as a delay may cause a failure that could lead to costly road damage.*
- 3.1-B.31 *Bridges. Bridge riprap and other abutment protection structures will be repaired by the District as soon as possible to prevent the loss of the bridge. Large, woody, floating debris will be cut free and removed or floated downstream. Unwanted debris that accumulates on the deck surfaces will be picked up or pushed to the adjacent bank for proper disposal. The District will not dump, push or scrape this material into the creek or reservoir.*
- 3.1-B.32 *Fords. As required, the District may also perform some rock armor maintenance on permanent fords. If the District needs to do maintenance work on a ford it will wait until low flow conditions to minimize impacts to the creek and water quality.*
- 3.1-B.33 *Cutbanks. Cutbanks will be frequently inspected by the District to help identify potential failures before they happen. The District will remove these materials (especially from inboard ditches) before they have an opportunity to enter a creek or reservoir, restore the road or trail surface drainage, and dispose of the material where it will not erode into a creek or reservoir or create other problems.*
- 3.1-B.34 *Fillslopes. If fillslope material could fall into a creek or reservoir, it should be excavated before it fails. The District will continue to work diligently to maintain proper drainage that helps minimize the development of the cracks and scarps. If*

*movement is persistent, the District will seek an alternative so the fill area is no longer needed or subjected to loading. If more width is needed to maintain safe passage, the District will explore the possibility of cutting further into the hillside, a retaining wall or other structure.*

### **Impact Significance After Mitigation**

The Best Management Practices, design standards, and environmental protection measures included in the Draft Plan, as amended above, should ensure that post-construction erosion and sedimentation are substantially reduced. It is expected that District implementation of the appropriate mitigation measures and BMPs will reduce this potential impact to a **less than significant level**. It is expected that the site specific impacts of all future projects in stream channels described in the Draft Plan can be reduced to a less than significant level by applying the mitigations/BMPs appropriate to the site and the project. The overall goal of the Draft Plan along with the mitigations listed above meet or exceed the goals and water quality objectives set forth in the Basin Plan.

### **Impact 3.1-C Construction of erosion reduction projects along roads and trails can cause erosion and stream sedimentation.**

Past road construction frequently resulted in roads that include an inboard ditch (i.e., a ditch on the uphill side of the road, between the road edge and the bank above the road). Periodically, culverts were placed beneath the road to carry runoff traveling along the inboard ditch to a stream channel or open hillside below the road; these are called ditch relief culverts (since they relieve the ditch of its flows so that the flow does not become so great it travels across the road). There are a number of problems with this system, including:

In some locations there are improperly constructed or an insufficient number of ditch relief culverts. The flows in the ditch become so large as to cause major gullies which then deliver sediment to streams. Gullies can be formed by inadequately placed culverts, where the culvert outfall is not properly designed and causes erosion and gully formation (e.g., shotgunned culverts or culverts without adequate downspouts). Of the 156 ditch relief culverts identified on roads, 150 have been recommended for treatment. Left untreated, these culverts have the potential to deliver 2,216 cubic yards of sediment to streams over the next 20 years.

- There are several other sources of road and trail related erosion. Approximately 3,430 cubic yards of sediment is estimated to be delivered to the Watershed in the next 20 years from 187 "other" road-related erosion sites. An additional, approximately 306 cubic yards could possibly be delivered from 50 "other" trail-related sites. The majority of the "other" erosion types are gullies (created by inadequate drainage so that runoff runs down a road or trail and at a low point travels off the route to the hillside below where it erodes sediment on the hillside, ultimately delivering that sediment to a creek or reservoir) and road and trail rilling (where inadequate drainage and grading has resulted in the development of small gullies, or rills, on a route's surface). There are also springs and bank erosion. There were only a few unchanneled swales identified on the Watershed that can deliver sediment to a creek or reservoir. 180 (96%) of the road-related sites, and 44 (88%) of the "other" trail-related sites, will need some level of upgrade for the roads and trail network to be "storm proofed."

- There are several locations where flow from springs or drainage from unchanneled swales interact with the road. Treatments include providing a ditch to connect spring flow to a natural channel, a rolling dip to allow the spring to drain across the road, or a new culvert, or enhancing the ditch.
- A major source of erosion and sedimentation is caused by inadequate grading and drainage of the road and trails systems. The Draft Plan identifies about 51 miles of road and/or road ditch that requires action to "storm-proof" the road system. These 51 miles of road and/or road ditch currently drain directly to streams, delivering ditch flow, road runoff, and fine sediment to stream channels. Erosion can result from cutbank erosion triggered by dry ravel, rainfall, freeze-thaw processes, cutbank landslides, and vegetation cutting/grading practices. It can also result from inboard ditch erosion, mechanical pulverizing and wearing down of the road surface, and erosion of the road surface during wet weather periods. These roads have the potential to deliver 87,911 cubic yards of sediment to streams over the next 20 years.
- Fixing cut slope failures may involve re-vegetation, minor flattening or installation of some simple type of retaining structure to solve persistent problems. Stabilizing the toe of the slope by weighting it with heavy riprap may solve some failures. In other cases, a geotechnical or structural engineer may be needed for designing more complicated retaining structures or walls to solve larger unstable areas.

Recommended actions to address road and road ditch problems involve dispersing road runoff and disconnecting road surface and ditch drainage from the natural stream channel network. Treatments include removing outboard berms (which prevent runoff from crossing the road to the slope below), installing rolling dips, outsloping the road surface, and/or installing additional ditch relief culverts. In some cases, rock must be added to the surface of the road to adequately armor it.

In some cases, armoring of outboard fill faces is needed to protect them from erosion. This involves placing rock on the fill face (recommended for 146 locations).

The Draft Plan identifies 12.5 miles of trail that need treatment to control persistent erosion. Otherwise, these untreated trail segments could deliver 4,546 cubic yards of sediment to streams over the next 20 years. The erosion would be caused by pulverizing and wearing down the surface through recreational use and erosion of the trail surface during the wet season. Treatments generally involve dispersing trail runoff and disconnecting the trail surface from the natural stream channel network. Trail surface treatments include the installation of rolling dips, outsloping and the occasional installation of ditch relief culverts. Trail drainage treatment techniques are very similar to those prescribed for road surface drainage. These trails are treated as if they are small roads.

Constructing these various types of road and trail erosion control actions would substantially reduce the amount of sediment that could enter Watershed streams. However, it is possible that construction of these projects would result in bared earth that could erode, particularly during the first rainy season after construction. The potential erosion and resulting stream sedimentation is considered a ***potentially significant adverse impact***.

## **Mitigation Measures**

The mitigation measures listed under Impact 3.1-B apply to the potential sedimentation impacts resulting from this category of Draft Plan projects (except for those mitigation measures that are explicitly directed to work within stream channels).

## **Impact Significance After Mitigation**

The mitigation measures previously listed under Impact 3.1-B should ensure that post-construction erosion and sedimentation are substantially reduced. It is expected that District implementation of the appropriate mitigation measures and BMPs will reduce this potential impact to a **less than significant level**. It is expected that the site specific impacts of all future road and trail-related erosion control projects described in the Draft Plan can be reduced to a less than significant level by applying the mitigations/BMPs appropriate to the site and the project. The overall goal of the Draft Plan along with the mitigations listed above meet or exceed the goals and water quality objectives set forth in the Basin Plan.

## **Impact 3.1-D          Decommissioning of roads and trails can cause erosion and stream sedimentation.**

The District proposes to decommission all or parts of 8 system roads, 4 system trails, and a number of non-system routes. The District will maintain a prioritized list of non-system routes that may need decommissioning. Decommissioning of these non-system routes can range from minor work such as monitoring use and blocking passage to the trail to full decommissioning which might include full restoration of the trail, construction of physical barriers, signage, and patrolling. The roads and trails proposed for decommissioning include (the number of feet of road or trail proposed for decommissioning is shown in parentheses):

- Lagoon Fire Road (3,392 feet)
- Grassy Slope Road (2,019 feet)
- End of Worn Springs Road (280 feet)
- End of Oat Hill Road (674 feet)
- Interior Pine Point Road (1,130 feet)
- Bare Knolls Road (1,677 feet)
- Peters Dam Roads (1,160 feet)
- Boy Scout Road (600 feet)
- Upper Berry Trail (1,992 feet)
- Ridge Trail (3,445 feet)
- Upper portion of Little Carson Trail (1,352 feet)
- Lower Telephone Trail (**how many feet**)

The District's goal of decommissioning is to restore natural topography and habitat as much as possible so that maintenance work is no longer needed and to prevent future road related environmental impacts. Three primary objectives are: (1) to prevent road related debris flows and surface erosion; (2) to correct creek diversions (thereby preventing creek crossing washouts, fill failures, and potential problems created by creek diversions); and 3) restore



natural habitat to the greatest extent possible. This generally means at a minimum: excavating all creek crossings by removing all fills, culverts, bridges or fords; excavating unstable fillslopes; treating the road surface and inboard ditches to disperse runoff and prevent erosion; and mulching or revegetating any disturbed areas. This may include excavating the fillslopes on the downhill side of the road or trail and placing that material on the road/trail bed near the cutslope to try to reestablish the original topography of the slope. In some cases, because of past erosion or the presence of mature trees or other vegetation, some sections of road or trail will only have partial topographic restoration. Road segments that have the potential to generate erosion and discharge sediment into creeks or reservoirs must always be addressed. The District proposes the following methods for decommissioning work.

- When removing a creek crossing, the District will excavate all materials placed in the creek channel when the crossing was built, including the culvert and rock armor. The restored channel would be as wide or slightly wider than the original channel and have the same bottom grade, or slope, and orientation as the original channel. Ideally the natural channel and rock still exist under the culvert and fill. If the natural rock creek bottom was removed, new rock armor may need to be placed in the bottom of the channel to prevent downcutting. In some cases, the channel side slopes may need to be “pulled” back to a stable angle or armored to prevent sloughing. All the excavated materials will be disposed of in a location and manner where they will not erode and cause sediment to enter a creek or reservoir. In all cases the District will mulch and seed or plant the bare soil.
- Unstable fillslopes that would enter a creek or reservoir or that could impact another type of environmentally sensitive area will be entirely removed by the District. If the fillslope includes structures (crib walls, retaining walls, etc.) they will be removed as well. The excavated materials will be disposed of in a location and manner where they would not erode and cause sediment to enter a creek or reservoir. If the fill would not adversely affect the function of the final road surface drainage, it can be placed against the cutbank and used to fill the inboard ditches to restore natural topography. All disturbed areas will be revegetated.
- Cutbanks may need to have larger plants removed before restoring topography. Full restoration of steep slopes may not be desirable where springs surface on cutbanks. In general undisturbed native soil profiles upslope of cutbanks should not be disturbed and should not be used to provide material to match original slope.
- Surface drainage on abandoned routes needs to be addressed so that it is self-maintaining, adequately serves the area it drains and does not deliver sediment to a creek or reservoir. Insloped routes will be outsloped and their inboard ditches removed. Outside berms will also be removed. Ditch relief culverts will no longer be necessary and they can be removed as well. In situations where topographic restoration is limited, cross drains may need to be installed where necessary to prevent water from traveling down the old route and causing gullying. The number, location, and angle of the cross drain depends on the steepness of the route and the location of any spring or upslope gully. In most cases the original roadbed will be mechanically decompacted (using rippers or subsoilers) prior to landform restoration or installation of cross drains.

- Only in relatively few instances would road decommissioning need to include full recontouring of the original road bed. Typically, potential problem areas along a road are isolated to a few locations (perhaps 10% to 20% of the road to be decommissioned) where stream crossings need to be excavated, unstable landing and road sidecast fill needs to be removed before it fails, or roads cross potentially unstable terrain and the entire prism needs to be removed. Most of the remaining road surface simply needs improved surface drainage; using decompaction, road drains, and/or partial outsliping. The road surface would receive revegetation or mulching treatments in locations where eroded sediment could be delivered to a stream (such as the side slopes to excavated stream crossings), but in the cool coastal setting much of the decommissioned alignment can be left to naturally revegetate from nearby seed sources.
- Trail decommissioning essentially involves “reverse trail construction,” except that full topographic recontouring of the trail bed is not normally required to accomplish erosion prevention and sediment reduction goals. In order to protect the aquatic ecosystem, the goal is to “hydrologically” decommission the trail; that is, to minimize the effect of the trail on natural hillslope and watershed runoff.

The decommissioning would result in graded earth which can erode and cause sedimentation of streams, especially during the first rainy season after each project is completed. However, in locations where fillslopes are removed and the material placed on the roadbed, the decommissioning would reestablish historical drainage patterns across the old road/trail location. While there may be some temporary erosion, much of the road sediments would be captured immediately downslope of the restored site, so that erosion contributions to streams would be minimal. The potential for erosion and transport of eroded soils to streams from all decommissioning activities would be a ***potentially significant adverse impact***.

### ***Mitigation Measures***

All the mitigation measures pertinent to decommissioning listed under Impact 3.1-B will apply. In addition, the following measure is included in the Draft Plan.

- Waterbars and cross-road drains will be installed at 50, 75, 100 or 200-foot intervals, or as necessary at springs and seeps, to disperse road surface runoff, especially on roads that are to be decommissioned. Cross-road drains are large ditches or trenches excavated across a road surface to provide drainage and to prevent the collection of concentrated runoff on the former road bed. They are typically deeper than waterbars and do not allow for vehicle access (PWA, 2003, p. 15).

### ***Impact Significance After Mitigation***

The mitigation measures previously listed under Impact 3.1-B plus environmental protection measures (Chapter 3 of the Draft Plan) included in the Draft Plan should ensure that post-construction erosion and sedimentation are substantially reduced. These measures include: protecting flows within creeks; timing work to minimize impacts; staging and storing materials to not cause impacts; confining work to existing disturbed areas wherever feasible; minimizing the amount of disturbance; disposing of spoils to areas where sensitive resources are not affected; installing temporary erosion control measures when warranted; educating workers about

resource sensitivity, including training to identify sensitive species and resources; monitoring construction to ensure all measures are followed; controlling the spread of invasive weeds; retaining and reusing topsoil; reintroducing Special Status Species of plants where and when appropriate; and signing construction sites to warn the public. It is expected that District implementation of the appropriate mitigation measures and BMPs will reduce this potential impact to a ***less than significant level***. It is expected that the site specific impacts of all future road and trail decommissioning projects described in the Draft Plan can be reduced to a less than significant level by applying the mitigations/BMPs appropriate to the site and the project. The overall goal of the Draft Plan along with the mitigations listed above meet or exceed the goals and water quality objectives set forth in the Basin Plan.

**Impact 3.1-E            Disposing of spoils generated by other projects could result in erosion and sedimentation.**

The Draft Plan calls for projects that involve removing soil and disposing of it at a different location. The goal of the Draft Plan is to use these spoils for locations where long-term restoration is the goal (e.g., used for decommissioning roads, improving the outslope in nearby locations, building up the roadbed) or to place them in locations where they do not pose an erosion problem. The District also has an area dedicated to every day storage and staging of materials (the Bullfrog Quarry) where it can store, re-handle, and re-use the material as needed. The Draft Plan identifies locations where this material can be disposed of, if it is not reused for another restoration project. In general, the disposal locations are on or along roads near the site or at existing landings. For decommissioning projects where stream fill crossings and unstable slopes are removed, the material is generally placed on the old road bed to assist in returning the road to its original grade. In some cases, spoils materials could be used for road upgrading (i.e., converting an insloped road to an outsloped road). Unless spoils are properly disposed of and protected, they could erode and cause stream sedimentation. This is a ***potentially significant adverse impact***.

***Mitigation Measures***

Mitigation Measure 3.1-B.19 specifically applies to this impact.

***Impact Significance After Mitigation***

Mitigation Measure 3.1-B.19 should ensure erosion from spoils sites are substantially reduced. It is expected that District implementation of this mitigation measure will reduce this potential impact to a ***less than significant level***. It is expected that the site specific impacts of all future spoils disposal projects described in the Draft Plan can be reduced to a less than significant level by applying the mitigation measure at each disposal site. The overall goal of the Draft Plan along with the mitigations listed above meet or exceed the goals and water quality objectives set forth in the Basin Plan.

**Impact 3.1-F            Construction of new trails and road sections could cause erosion and stream sedimentation.**

As described in Section 1.6(E), the Draft Plan calls for converting four system roads (Bald Hill Trail to Five Corners, Deer Park Trail to Worn Springs Road, and Laurel Dell to Barth's Retreat, as well as minor rerouting of Boy Scout Road) to trails and rerouting these trails. Four system trails (Azalea Hill, Upper Canyon, Little Carson, Potrero Meadow, and the bottom of Junction Trails) will be rerouted. Reroutes are recommended because the existing routes are too steep, and they are eroding, or the trail goes through or near sensitive habitat. Most of these reroutes are relatively short distances (about 500 feet or less). There are two major reroutes: about 4,075 feet of the Azalea Hill Trail and about 1,300 feet of Upper Canyon Trail. While the old road or trails would be decommissioned, thereby substantially reducing erosion potential, the construction and future use of the new roads and trail could cause erosion and stream sedimentation. This would be a **potentially significant impact**.

### **Mitigation Measures**

- 3.1-F.1 The minimum width needed for safe use of the trail will be disturbed for trail construction.
- 3.1-F.2 Trail improvements should be constructed according to recommendations outlined in either the *Trail Manual for the Maintenance and Operation of Trails in the East Bay Regional Park District* (McDonald 1995), *A Handbook on Trail Building and Maintenance* (Griswold 1996), *NPS Trails Management Handbook* (National Park Service, 1983), or the *Trails Handbook* (California Department of Parks and Recreation 1998). Class VI trails should be built and repaired to allow safe horse passage per guidelines set forth in *Trails Manual* (Vogel, 1982). Regarding both new and restored trails and roads, the following measures are recommended for trail stability and erosion control:
- a. The trails should travel up and down grade ("undulating grades") to allow rolling dips to dewater the trail.
  - b. Trails shall generally follow a curvilinear alignment. Maximum grades should generally not exceed 10%, though steeper grades can be permitted for short sections; the average slope should be maintained at 7.5% or less.
  - c. Class VI trails shall be wide enough to allow safe use by equestrians and hikers. Trails that are expected to have light use generally have trail treads 2-4 feet wide, while heavy use trails are generally designed to be 5-6 feet wide. A maximum of four feet is recommended for the proposed trails.
  - d. Trails shall be constructed with a 3-4% outslope wherever feasible. Two approaches can be applied to gain the desired outslope; a) blade off the outer trail edge with a trail machine or hand implements, or b) import material to raise the inslope portion of the trail. The first approach should be avoided where the trail is close to a drainageway, since the blading operation will deposit some sidecast material on the downslope side of the roadway and the material could be conveyed downslope to the active channel.

- e. On both insloped and outsloped trail segments, install rolling dips where needed. If rolling dips are not feasible, install water bars at a spacing as needed. On especially steep grades, closer spacing may be necessary. The optimal outlet locations for runoff collected and diverted by dips and bars would be on locally convex slopes. Where necessary, rock the outlet.
  - f. Construct stabilized at-grade crossings of streams using the design and construction procedures included in the *Handbook for Forest and Ranch Roads - A Guide for Planning, Designing, Constructing, Reconstructing, Maintaining and Closing Wildland Roads* (Pacific Watershed Associates 1994), *A Handbook on Trail Building and Maintenance* (Griswold 1996), or the *Trails Handbook* (California Department of Parks and Recreation 1998).
  - g. Proper culvert design and construction procedures are outlined in the *Handbook for Forest and Ranch Roads - A Guide for Planning, Designing, Constructing, Reconstructing, Maintaining and Closing Wildland Roads* (Pacific Watershed Associates 1994). Wherever culverts are installed, construct a rocked apron at the outlet; the stabilized apron should be at a flat or mild grade (e.g. 1-2%); extend a minimum of five feet downslope from the outlet and one foot (vertical) up onto the adjoining banks (higher where outlet channel banks are steeper than 2:1); and comprise strongly embedded (e.g. 60%) larger rock and cobble infill to minimize the risk of erosion within the structural elements.
- 3.1-F.3 When laying out the trail location, MMWD should attempt to locate the trail in locations where any erosion that does occur will be drained to areas that do not connect to the stream system.
- 3.1-F.4 Areas that are disturbed when constructing the trail that are outside the trail tread shall be reseeded with native plant seed, and/or punched straw or other locally available mulch will be placed to protect against raindrop impact and to minimize soil detachment and downslope movement.
- 3.1-F.5 New trail grading or culvert crossing installation should be implemented during the dry season, which from a regulatory standpoint typically extends from April 15 to October 15. Appropriate erosion control measures (i.e. BMPs), including seeding, should also be installed prior to the first rain of the winter season, or by October 15.

### ***Impact Significance After Mitigation***

These standard trail design and erosion control measures would reduce the amount of erosion from new trail construction and use. In addition, the reduction in erosion from decommissioning of the steep, eroding trail sections would more than compensate for any new erosion caused by these trails. These mitigation measures would reduce the impact to a ***less than significant level***. The overall goal of the Draft Plan along with the mitigations listed above meet or exceed the goals and water quality objectives set forth in the Basin Plan.

**Impact 3.1-G            Storage of fuels or other materials could spill and pollute area streams and reservoirs.**

Hazardous materials used to construct the project would be limited to fluids used for vehicles, heavy equipment, and power tools. This could include gasoline, diesel fuel, motor oil, brake fluid, and possibly other chemicals. It is possible that some of these materials might be stored in the area near where the work is occurring. If these materials are not properly stored and handled, they could spill and pollute nearby streams and reservoirs. This would be a ***potentially significant adverse impact***.

***Mitigation Measures***

Mitigation Measure 3.1-B.9 applies to this impact.

***Impact Significance After Mitigation***

It is expected that appropriate storage, transport, and use of fuels and other vehicle-related pollutants per Mitigation Measure 3.1-B.9 would reduce the risk of water pollution from those materials to a ***less than significant impact***. The overall goal of the Draft Plan along with the mitigations listed above meet or exceed the goals and water quality objectives set forth in the Basin Plan.

## 3.2 VEGETATION

### A. Setting

Much of the following discussion of the vegetation setting was taken from a botanical report prepared for MMWD during preparation of its Vegetation Management Plan (Patterson, 1990).

#### 1. Climate and Topography

The Watershed is generally dominated by the typically equable coastal climate of central California. This includes mild wet winters (annual rainfall of up to 50 inches or more), no more than about 50 days of freezing temperatures, and relatively hot dry summers. While summer temperatures routinely approach the 90-to-100°F range, it is not uncommon for much of the area to be held in the 50s by the extensive summer fog. Winters, because of the relatively low elevation and close proximity to the ocean, rarely include sub-freezing weather for any period of time; however, it is not unusual for at least the summit of Mt. Tamalpais to receive several dustings of snow over the course of a normal winter.

Within the Watershed, there is a wide range of microclimatic conditions, ranging from the fog-influenced seaward hills on Bolinas Ridge to the open dry grasslands and oak savannas of the more interior low hills near Fairfax (White Hill and Bald Hill), plus the exposed mountain summits which attain elevations of more than 2,000 feet above sea level. Overall, the Watershed represents a microcosm of coastal central California and includes a broad spectrum of local microclimatic situations which in turn produce a representative range of coastal plant communities.

Physically, the Watershed's complex topography also contributes greatly to the presence of a varied environment for plant growth. In addition to the classic north slope-south slope differentiation which often results in forest on the former and brush on the latter, there is an abundance of intermediate exposures, varying slope gradients (which in turn have influenced soil development and/or erosion), elevation range from 400 to 2,500 feet, and a transition from the coastal hills (which are less than two miles from the ocean) to the relatively protected (and dry) "inland" hills around Bald Hill and Pilot Knob. This wide range of physical exposures and related physiographic situations has allowed for the development of typical coastal oak woodlands while at the same time providing the more restricted conditions required by coast redwoods and bishop pine, plus the hot dry exposures dominated by chamise chaparral and succulent rocky cliff dwellers such as *Epilobium canum* (California fuchsia), *Dudleya cymosa* (rock lettuce), *Sedum* species (stonecrop), *Pallaea* species, and *Cheilanthes* species (rock ferns).

Hydrologically the Watershed is not particularly unusual, but because of the great elevation range, large overall size, and characteristics of the underlying bedrock, there is an abundance of small ephemeral creeks, numerous perennial springs, and a few relatively well developed perennial streams. The development of the area as a public water supply watershed, with its man-made reservoirs and controlled releases, has enhanced the local hydrological situation along the local creeks, but has eliminated sizable sections of stream channel and presumed riparian vegetation. Several of the reservoirs are old enough that they support some unusual or noteworthy occurrences, including all four species of cattails at Phoenix Lake, numerous weedy

strand species along the lakeshores, and several well developed areas of freshwater marsh. Other sites of hydrological significance include Willow Meadow, Hidden Lake, Lily Lake, and Rock, Colier, Liberty, and other springs.

### **Geology and Soils**

Of particular interest to a botanical understanding of the Watershed is the Watershed's complex geology and substrate configuration. The Watershed exhibits a considerable mixing of basic rock types, from the sandstone and shale of Mt. Tamalpais, to the extensive exposed serpentines found through the central part of the Watershed. Many plant communities (and the individual species which compose them) are found to prefer (or at least better compete) on certain substrate types, while not being able to persist on others. Within the Watershed, the most notable substrate which has a significant influence on plant growth (and which figures prominently in the ecology and distribution of many sensitive taxa) is the local serpentine (comprising about 15 percent of the Watershed).

Specific soil qualities of the Watershed are related directly to the underlying parent materials, but are not, in and of themselves, a primary influence on local plant growth. Rather, because of the Watershed's relatively steep and largely rocky terrain, the more pertinent factor is simply whether or not any soil has developed, on serpentine, and on soil derived from it, the local vegetation reflects this unusual growth medium and is peculiarly differentiated. However, much of the Watershed is simply devoid of any well developed soil and is influenced more by the local erosion/deposition patterns and aspects than the type of soil itself.

The essentially toxic mineral environment found in serpentine habitats precludes many of the normal regional plants from growing here and favors relatively distinct and different plant communities from the surrounding non-serpentine. Local serpentine vegetation is typically composed of species restricted to this rock type, with many thriving because of the reduced interspecific competition. Serpentine also supports a number of uncommon and/or threatened species including herbaceous species such as *Hesperolinon congestum* (Marin western flax), *Streptanthus batrachopus* (Tamalpais jewel-flower), and *Streptanthus glandulosus* ssp. *pulchellus* (Mt. Tamalpais jewel-flower) and shrub species such as *Arctostaphylos hookeri* ssp. *montana* (Mt. Tamalpais manzanita). Succession is often very much slower than for non-serpentine (especially for chaparral types) and the poor nutrient regime and severe rockiness result in open cover, even in the later stages of succession. This leaves room for some continued representation from all stages as the communities mature, including allowing many of the rare herb species listed above, to persist over long periods of time. In a few areas, however, dense *A. hookeri* ssp. *montana* stands and *Cupressus sargentii* (Sargent cypress) woodlands reach high enough densities to preclude most annuals and perennial herbs.

### **General Habitats and Plant Communities**

As has been discussed in relation to the many physical parameters present in the Watershed, the Watershed lands provide an extremely wide range of conditions for plant growth and have come to support a remarkable diversity of plant communities and associations. The Watershed contains a rich spectrum of basic vegetation types and plant communities, from almost barren rock cliffs and outcrops, through open grassland and scattered brush (on rock or within grassland) to dense brushfields, open-to-closed canopy woodlands and dense forest. Species



composition within each and every type is quite variable depending on such local influences as substrate character, elevation and exposure, distance from the ocean, past land use, successional stage, and degree of disturbance.

The following are brief descriptions of the Watershed's major plant communities, described here without quantitative data, but in sufficient detail to provide a useful baseline for discussing sensitive plant occurrences.

### Barrens and Rock Habitats

The Watershed contains several basic rocky habitat types, including large exposed outcrops of solid bedrock, broken rockfields of boulders and fractured bedrock, occasional small scree and talus slopes, and extensive areas of shallowly covered boulders, small rocks, and gravels. Serpentine rocks are especially interesting since these sites not only have poor nutrient composition, but the parent material is also relatively toxic. Rock habitats occur scattered throughout the Watershed, with notable occurrences being atop Mt. Tamalpais and along the broken serpentine belt. Most of these sites consist of predominantly bare rock, but cracks and spaces between rocks typically support a number of rare taxa including *S. batrachopus*, *S. glandulosus* ssp. *pulchellus*, *Navarretia rosulata* (Marin County navarretia), *H. congestum*, *Calamagrostis ophitidis* (serpentine reed grass), and *Eriogonum luteolum* var. *caninum* (Tiburon buckwheat).

### Grassland

The Watershed contains roughly 1,500 acres of open grassland including relatively species-rich perennial grasslands. Dominant grass species in the non-native annual grasslands include *Avena barbata* (slim oatgrass), *Avena fatua* (wild oats), *Bromus diandrus* (ripgut brome), *Bromus hordeaceus* (soft brome), *Bromus madritensis* ssp. *rubens* (redtop brome), *Lolium multiflorum* (Italian ryegrass), *Hordeum murinum* (foxtail), *Vulpia myuros* (rattail fescue), and *Briza maxima* (big quaking grass). Dominant forbs in the non-native annual grasslands include *Erodium botrys* (longfruit broad-leaf filaree), *Erodium cicutarium* (red-stem filaree), *Geranium dissectum* (geranium), *Hemizonia congesta* ssp. *congesta* (yellow hayfield tarweed), *Carduus pycnocephalus* (Italian thistle), and *Rumex acetosella* (sheep sorrel). Perennial grasslands support substantial stands of native grasses including *Festuca californica* (California fescue), *Festuca idahoensis* (Idaho fescue), *Festuca rubra* (red fescue), *Nassella pulchra* (purple needlegrass), *Nassella lepida* (slender needlegrass), *Melica californica* (California melicgrass), *Melica geyeri* (Geyer's oniongrass), *Melica torreyana* (Torrey's melicgrass), *C. ophitidis*, *Elymus glaucus* ssp. *glaucus* (blue wildrye), *Bromus carinatus* var. *carinatus* (California brome), *Danthonia californica* var. *californica* (California oatgrass), and *Poa secunda* (bluegrass).

The best developed native grasslands occur on the more protected (north facing) slopes, while those facing directly south tend to be more annual and non-native in character. Grasslands on serpentine (or adjacent to it) are noteworthy because of their high dominance by native grasses (including several sizable stands of *Festuca californica*) and the inclusion of numerous other native herbs such as *Montia gypsophyloides* and *Calycadenia multiglandulosa* var. *cephalote*. Special status plant species occur in very localized populations with *C. ophitidis* and *Astragalus breweri* (Brewer's milk vetch) restricted to serpentine substrates and *Perideridia gairdneri* ssp. *gairdneri* (Gairdner's yampah) and *Cirsium hydrophilum* ssp. *vaseyi* (Mt. Tamalpais thistle) in

moist meadows. The principal grassland communities include the following (an asterisk by the community name indicates that it is the equivalent of the Holland 1986 classification system):

- North Slope Perennial Grassland (also known as Coastal Prairie\*, Bald Hills Prairie\*, Montane Meadow\*) is generally found on protected slopes and ridgetops, steep soiled slopes, in small isolated pockets, as well as at the edge of serpentine. The dominant genera are *Nassella*, *Melica*, *Poa*, *Festuca*, *Elymus*, *Bromus*, *Achillea*, *Agoseris*, and *Brodiaea* with lesser occurrences of *Phalaris*, *Carex*, and *Calamagrostis*).
- South Slope Perennial Grassland (also known as Coastal Prairie\*, Valley Needlegrass\*) is generally found on gentle south slopes, valley bottoms, and edges of forest/woodland swales. The dominant genera are *Nassella*, *Elymus*, *Melica*, *Poa*, *Juncus*, *Lupinus*, *Thermopsis*, and *Hemizonia*.
- Serpentine Grassland is generally found on developed soils on and adjacent to serpentine on all slopes and exposures. The dominant species are *C. ophitidis*, *Elymus elymoides* (squirreltail grass), *F. californica*, *M. californica* and *Agrostis* species.
- Non-Native (Annual) Grassland is generally found on gentle slopes and dry valleys, ridges with shallow soils, south exposures, and roadcut and trail edges. The dominant genera are *Avena*, *Bromus*, *Lupinus*, *Vicia*, *Lolium*, *Brassica*, *Clarkia*, *Hordeum*, *Vulpia*, *Orthocarpus*, *Layia*, and *Brodiaea*.

### Chaparral and Scrub

Brush communities are common and abundant in the Watershed, although almost all of this cover type is chaparral. The dominant species, including *Adenostoma fasciculatum* (chamise), *Arctostaphylos glandulosa* (Eastwood's manzanita), *Pickeringia montana* (chaparral pea), and *Ceanothus* species, are quite common and abundant, and are often mixed with lesser amounts of *Dendromecon rigida* (bush poppy), *Quercus wislizenii* (interior live oak), *Quercus parvula* var. *shrevei* (Shreve's oak), and *Garrya elliptica* (silk tassel). The chaparral on non-serpentine varies greatly in species composition, but tends to include the same species, just in varying proportions. Serpentine chaparral is generally quite distinct, supporting a much different flora dominated by *A. hookeri* ssp. *montana* (Tamalpais manzanita), *Ceanothus jepsonii* (Jepson's ceanothus), *Heteromeles arbutifolia* (toyon), *Eriodictyon californicum* (yerba santa), and (*Quercus durata* (leather oak). Rare shrubs found in non-serpentine chaparral habitats include *Rhododendron macrophyllum* (big-leaf rhododendron), *Arctostaphylos virgata* (Bolin's manzanita), and *Ceanothus masonii* (Mason's ceanothus). The principal chaparral communities include:

- Mixed Chaparral (also known as Northern Mixed Chaparral\*) is generally found on exposed rocky slopes, steep non-serpentine ridges, and south exposures. The dominant species are *A. fasciculatum*, *A. glandulosa*, *P. montana*, and *Ceanothus* species, as well as some occurrences of *Garrya elliptica*, *Q. wislizenii*, and *H. arbutifolia*.
- Chamise Chaparral\* general habitat consists of steep, rocky, and exposed south slopes. The dominant species are *A. fasciculatum*, *P. montana*, and *E. californicum*.

- Interior Live Oak Chaparral\* also known as Tamalpais form is largely found on moderate and steep north slopes and relatively protected sites. The dominant species are *Q. parvula* var. *shrevei*, *H. arbutifolia*, *Rhamnus californica* (coffeeberry), and some occurrences of *A. virgata*.
- Serpentine Chaparral\* is found on exposed serpentine slopes, ridges, steep serpentine hillsides and rockland. The dominant species are *Ceanothus jepsonii*, *Quercus durata*, *A. hookeri* ssp. *montana*, *A. fasciculatum*, *C. sargentii*, *H. arbutifolia*, *E. californicum*, and *P. montana*.
- Maritime Chaparral\* is found in the fog zone on mesic but steep or rocky north slopes and on the edge of redwoods. The dominant species are *Arctostaphylos nummularia* (glossy-leaf manzanita), *Gaultheria shallon* (salal), *Chrysolepis chrysophylla* (chinquapin), and *Vaccinium ovatum* (evergreen huckleberry).
- Northern Coastal Scrub\* is generally found on windy, exposed rocky slopes, mostly coastal exposure, in the fog belt and locally mostly on south slopes. The dominant species are *Mimulus aurantiacus* (sticky monkey flower), *A. fasciculatum*, *Artemisia californica* (California sage), *Salvia columbariae* (chia), *Rubus ursinus* (California blackberry), *Baccharis pilularis* (coyote brush), *Polystichum munitum* (common swordfern), *Castilleja* species (paintbrush), and *R. californica*.
- Serpentine Seep Scrub is mostly found around seeps, springs, and small creeks on serpentine. The dominant species are *Rhododendrum occidentale* (western azalea), *Helenium* species (sneezeweed), *Stachys* species (hedge nettle), *H. arbutifolia*, *Iris* species (iris), *Umbellularia californica* (California bay), *Morella californica* (California wax myrtle), *F. californica*, *Salix* species (willow), *Sisyrinchium bellum* (blue-eyed grass), and *Zygadenus* species (star lily).

### Woodland

The Watershed contains a number of woodland associations, the primary ones being coast live oak, live oak/California bay, and oak/madrone. The middle and upper elevation ravines and ephemeral creek canyons tend to support oak/bay woodland (often dense enough to be called forest), while the more exposed and gentler hillsides are frequently dominated by live oak/black oak/madrone associations. Of some interest are the small stands of *Quercus garryana* (Oregon white oak) in the Carson Ridge area. Because of the Watershed's relatively long period of fire suppression, much of the area's woodland communities have or are maturing into denser forest associations.

There is relatively little oak savanna, with no blue oak evident and only meager valley oak representation. Because of the mature character of many of the Watershed's natural communities, the boundaries between woodland and both chaparral and forest types are greatly blurred. The principal woodland communities include:

- Coast Live Oak Woodland\* is generally found in protected ravines, gentle canyons and on north exposures. The dominant species are *Quercus agrifolia* (coast live oak), *U. californica*

as well as some occurrences of *Arbutus menziesii* (madrone) and *Pseudotsuga menziesii* var. *menziesii* (Douglas fir).

- Mixed North Slope Cismontane Woodland\* is found on many semi-protected slopes and hills and most canyons and ridges. The dominant species are *Q. agrifolia*, *P. menziesii* var. *menziesii*, *Lithocarpus densiflorus* var. *densiflorus* (tanoak), *A. menziesii*, *U. californica* and *Sequoia sempervirens* (coastal redwood).
- California Black Oak Woodland is generally found on gentle lowland hills and valleys, on south slopes with good soils, and benches. The dominant tree species are *Quercus kelloggii* (black oak), *Q. agrifolia*, *Quercus douglasii* (blue oak), *Quercus lobata* (valley oak), *Aesculus californica* (California buckeye), and *A. menziesii*. The groundcover is dominated non-native annual grass species from genera including *Avena*, *Bromus*, *Briza*, *Lolium*, and *Hordeum*.
- Valley Oak Woodland/Savanna is generally found on lower hills and gentle or flat valley bottoms and edges of open grassland. The dominant species are *Q. lobata*, and *Q. agrifolia* with a dense shrub layer dominated by *Toxicodendron diversilobum* (poison oak) and *Cytisus monspessulanus* (French broom). Both annual and perennial grassland species are common.

## Forest

Forest communities in the Watershed include coast redwood forest on the most protected slopes and canyons, mixed evergreen forest on the moderately protected slopes and most upper north-facing canyon walls, and a wide range of species combinations varying by slope, exposure, rockiness, and other site factors. The two forest communities of greatest botanical significance are the redwood forests and groves, and the local serpentine forests of *C. sargentii*. The northeast slope of Bolinas Ridge is notable for its vast, relatively uniform forest cover (logged in the 1940s) blending from oak/madrone and mixed evergreen forest on the upper slopes to dense redwood forest plus well developed tanoak on previously burned slopes and *Torreya californica* (nutmeg) in the deeper canyons.

The most common forest species include *Q. agrifolia*, *A. menziesii*, *P. menziesii* var. *menziesii*, *U. californica*, *S. sempervirens*, and *L. densiflorus* var. *densiflorus*. Mixed in on various exposures are lesser amounts of *Torreya californica*, *Quercus chrysolepis* (canyon live oak), *Quercus kelloggii*, *Chrysolepis chrysophylla*, and *Acer macrophyllum* (bigleaf maple). While there are no tree species that are especially rare or sensitive, the local stands of *Pinus muricatus* (bishop pine) and *C. sargentii* are of restricted occurrence and/or limited abundance. The principal forest communities include:

- Mixed Evergreen Forest\* is generally found on coarse to rocky soils on protected (coastal) slopes and canyons. The dominant species are *P. menziesii* var. *menziesii*, *Q. agrifolia*, *A. menziesii*, *L. densiflorus* var. *densiflorus*, and *U. californica*.
- Upland Redwood Forest\* general habitat is north exposures and canyons; shallow, well drained soils; steep canyons and in the fog belt. The dominant tree species are *S.*

*sempervirens*, *Lithocarpus densiflorus* var. *densiflorus*, *A. menziesii*, *P. menziesii* var. *menziesii*, and *C. chrysophylla*, with *V. ovatum*, and *P. munitum* dominating the understory.

- Douglas Fir Forest is generally found on better soils on north and east exposures, most major tributary canyons and the windward side of ridges. The dominant species are *P. menziesii* var. *menziesii*, *L. densiflorus* var. *densiflorus*, *A. menziesii*, and *Q. chrysolepis*.
- Coast Live Oak Forest\* occurs in protected canyons and slopes, in rocky areas and in drier areas than mixed evergreen. The dominant species is *Q. agrifolia* with some occurrences of *Q. chrysolepis* and *U. californica*.
- Oak-Bay Forest is generally found in ephemeral ravines and most mesic canyon slopes. The dominant species are *Q. agrifolia*, *U. californica*, *L. densiflorus* var. *densiflorus*.
- Oak – Madrone Forest is mostly found on moderately exposed, gentle slopes and lower north facing hills. The dominant species are *Quercus kelloggii*, *Quercus agrifolia*, *Arbutus menziesii*, *Symphoricarpos* species, and *Toxicodendron diversilobum*.
- Tanoak Forest occurs mostly in protected and gentler northern exposures, and as the understory to climax forest. The dominant species is *L. densiflorus* var. *densiflorus*, with some occurrences of *P. menziesii* var. *menziesii*, *A. menziesii*, *Quercus* species and *S. sempervirens*.
- Northern Interior Cypress Forest\* is generally found on serpentine rockland and ridges with occasional occurrences on non-serpentine adjacent to serpentine. The dominant species found are *C. sargentii* and *Arctostaphylos hookeri* ssp. *montana*.
- Northern Bishop Pine Forest\* is mostly found on exposed south facing ridges and poor soils. The dominant species is *P. muricatus* with some occurrences of *P. menziesii* var. *menziesii* and *Quercus* species.

#### Wetlands (Seeps and Springs, Riparian, Lakeshores)

The Watershed is not rich in wetland communities, but the list of species represented here that are restricted to wet places is both impressive and varied. The communities include riparian woodland, willow thicket, wet meadow, seeps and springs. Notable wetland sites include Hidden Lake, High Marsh, Lily Lake, Willow Meadow, Rock, Liberty and Colier Springs, Potrero Meadow, and Lagunitas Creek below Alpine Dam. Sensitive species that occur in wetland habitats in this region are not abundant, but include *Perideridia gairdneri* ssp. *gairdneri* (Gairdner's yampah), *C. hydrophilum* ssp. *vaseyi*, and *Elymus californicus* (California bottlebrush grass). Wetlands represent some of the most sensitive habitats in the Watershed being vulnerable to drainage and runoff alterations, erosion and sedimentation, physical trampling, extensive shading by tree cover, and even annual weather patterns (i.e., drought). The principal wetland communities include:

- Riparian Woodland (also known as White Alder Riparian Forest\* and Coast Live Oak Riparian Forest\*) is found along streambeds, mostly perennial creeks. The dominant

species are *Alnus rhombifolia* (white alder), *Salix lasiolepis* (arroyo willow), *Salix laevigata* (red willow), *S. lucida* ssp. *lasiandra* (yellow willow), *P. menziesii* var. *menziesii*, *A. macrophyllum*, and *Quercus* species.

- Riparian Thicket (also known as North Coast Riparian Scrub\*) is generally found on streambeds, ephemeral and perennial creeks and seeps and springs. The dominant species are *Salix* species, *A. rhombifolia*, *R. ursinus*, *R. occidentale*, and *Carex*.
- Seeps and Springs is found on wet spots on any exposure or slope. The dominant genera are *Carex*, *Juncus*, *Epilobium*, *Mimulus*, *Stachys*, *Scirpus*, *Eleocharis*, *Aquilegia*, and *Cirsium*.
- Wet Meadow (also known as Freshwater Seep\* and Montane Meadow\*) is generally found on moist flats, poorly drained valley bottoms, creekside terraces and below springs. The dominant genera are *Carex*, *Juncus*, perennial grasses, *Epilobium*, *Mentha*, *Rumex*, *Phalaris*, *Stachys*, *Scirpus*, and *Eleocharis*.
- Coastal Freshwater Marsh\* is generally found on calm sections of open creekbeds, on lakeshores and in wet depressions and seeps. The dominant genera are *Typha*, *Scirpus*, *Juncus*, *Polygonum*, *Carex* and *Epilobium*.

### **Sensitive Plant Communities**

The Watershed contains several sensitive plant communities, including native grasslands, serpentine-dependent communities, riparian communities, redwood forest, and oak woodlands. These communities are considered "sensitive" because they are relatively uncommon, support species that are Special Status Species or other species uncommon to the general area, and/or are plant communities that are declining or at risk in the State. For example, the State is concerned about the loss of oak woodlands in the State, and in 2004 passed the Oak Woodlands Conservation Act. Among other requirements, this Act requires counties to require mitigation alternatives for projects where an EIR, mitigated negative declaration, or negative declaration is required and where the project would result in a conversion of oak woodlands.

## **2. Special Status Species**

Special Status Species are taxa listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) or California Department of Fish and Game (CDFG), taxa designated as candidates for listing, or any species of concern or local concern by USFWS and/or CDFG. They include species listed in the Inventory of *Rare and Endangered Plants of California* prepared by the California Native Plant Society (CNPS). Special Status Species of California include:

- Plant species designated as threatened, or endangered under Section 4 of the Federal Endangered Species Act;
- Species designated as rare, threatened, or endangered by California Department of Fish and Game under the California Endangered Species Act;

- Species that are recognized as candidates for listing by agencies with resource management responsibilities such as USFWS, U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), and California Department of Fish and Game;
- Species defined by the USFWS or CDFG as species of concern;
- Species considered rare, threatened, or endangered pursuant to Section 15380 of the CEQA Guidelines;
- Species protected by California Fish and Game Code Sections 3503, 3503.5 and 3511;
- Plant species listed in the *Inventory of Rare and Endangered Plants of California* prepared by the California Native Plant Society (CNPS).

The Watershed has been surveyed for Special Status Species by numerous researchers. These surveys show that the Watershed supports one Federal and State Threatened species *Hesperolinon congestum* (Marin dwarf flax) and one State Rare species *Ceanothus masonii* (Mason's ceanothus). Several other threatened and endangered species have been reported from the general vicinity but never sighted on the Watershed, or they have been reported on the Watershed in the past but have become extinct on the Watershed. While these species are not expected to occur where projects are located, they will be searched for when botanists conduct required pre-design surveys (see the recommended mitigation measures for Impact 3.2-A). These species include:

- *Delphinium bakeri* (Baker's larkspur) – Federal Endangered, State Rare, CNPS List 1B
- *Holocarpha macradenia* (Santa Cruz tarplant) – Federal Threatened, CNPS List 1B
- *Pentachaeta bellidiflora* (White-rayed pentachaeta) Federal Endangered, State Endangered, CNPS List 1B
- *Pleuropogon hooverianus* (Hoover's sempahore grass) State Candidate for Endangered, CNPS List 1B

The Watershed also supports a number of species that are listed by the CNPS. These species are listed on Table 5 and shown on Figures 10 to 13.

MMWD staff has recently field surveyed a number of trail and road sections for Special Status Species. The following trails and sections have been surveyed and would not require additional surveying. Where MMWD has identified the location of Special Status plants in past surveys, this information would be used when developing final construction plans for projects along that road or trail. These roads and trails would not require additional surveying for Special Status Species of plants.

- Bolinas Ridge Road from Bolinas-Fairfax Road to the McCurdy Trailhead – populations of *Ceanothus masonii*, *Arctostaphylos virgata*, and *Ceanothus gloriosus* var. *exaltatus* were located and mapped (January 2004)
- Middle Peak Road – no Special Status Species found (April 2004)

- Phoenix Lake Road – no Special Status Species found (April 2004)



**Table 5: Special Status Plant Species with Potential to Occur on the Watershed**

Common name <i>Scientific name</i>	Listing Status			Flowering Period	Habitat Preferences	Potential for Occurrence on the Watershed
	Federal	State	CNPS			
<b>Coast rock cress</b> <i>Arabis blepharophylla</i>	FSC		4	Feb.-May	Occurs in rocky outcrops and serpentine barrens. Elevation 3-1100 meters. Blooms February thru April.	Three occurrences have been documented in the Mt. Tamalpais watershed.
<b>Mt. Tamalpais manzanita</b> <i>Arctostaphylos hookeri</i> ssp. <i>montana</i>			1B	Jan.-April	Occurs in serpentine slopes in chaparral and grasslands, between 160 and 760 meters in elevation.	Of the 17 documented occurrences in the state, 11 are located in the Mt. Tamalpais watershed.
<b>Marin manzanita</b> <i>Arctostaphylos virgata</i>			1B	Jan.-April	Occurs on sandstone or granitic soils between 60 and 700 meters in elevation, generally in broadleaved upland forest, closed-cone coniferous forest, chaparral, or north coast coniferous forest	Of the 18 documented occurrences in the state, 7 are located on MMWD land in the Mt. Tamalpais watershed.
<b>Carlotta Hall's lace fern</b> <i>Aspidotis carlotta-halliae</i>			4	NA	Generally associated with serpentine outcrops in Chaparral and cismontane woodlands. Elevation 100-1400 meters.	Multiple occurrences have been documented in Marin County, with verified specimens from both Mt. Tamalpais and the Tiburon peninsula. The Mt. Tamalpais watershed has not been formally surveyed for this species.
<b>Brewer's milk vetch</b> <i>Astragalus breweri</i>			4	April-June	Generally associated with serpentinite and volcanic substrates in chaparral, cismontane woodland, and valley and foothill grasslands.	Multiple occurrences have been documented in the Mt. Tamalpais watershed, primarily in the Rock Spring and Little Carson Canyon areas.
<b>Small groundcone</b> <i>Boschmakia hookeri</i>			2	June-July	Occurs in open woods and shrubby places, and north coast coniferous forest. Generally associated with <i>Gaultheria shallon</i> .	Documented occurrences are restricted to the southern slope of Mt. Tamalpais between 90 and 885 meters in elevation. No occurrences have been reported since 1958, and none have been reported on MMWD lands.
<b>Oakland star tulip</b> <i>Calochortus umbellatus</i>			4	March-May	Occurs in chaparral and mixed evergreen forest.	Multiple occurrences have been documented in the Mt. Tamalpais watershed.
<b>Serpentine reedgrass</b> <i>Calamagrostis ophitidis</i>			4	April-June	Occurs on serpentine balds and in serpentine grasslands. Elevation 90-1065 meters.	This species is widely distributed through serpentine habitat in the Mt. Tamalpais watershed.

**Table 5: Special Status Plant Species with Potential to Occur on the Watershed**

Common name <i>Scientific name</i>	Listing Status			Flowering Period	Habitat Preferences	Potential for Occurrence on the Watershed
	Federal	State	CNPS			
<b>Brewer's calandrinia</b> <i>Calandrinia breweri</i>			4	March-June	Occurs on disturbed sites and burns in chaparral and coastal scrub. Generally found on sandy or loamy soils. Elevation 10-220 meters. .	Multiple occurrences have been documented in the Mt. Tamalpais watershed, though specific locations not given. No recent sightings have been verified.
<b>Mason's ceanothus</b> <i>Ceanothus masonii</i>		SR	1B	March-April	Occurs on serpentine ridges or slopes in chaparral or transitional zone between chaparral and woodland habitat types. Found between 180 and 460 meters in elevation.	Two of the five known Marin County Occurrences are situated within the Mt. Tamalpais watershed.
<b>Mt. Tamalpais thistle</b> <i>Cirsium hydrophilum</i> var. <i>vaseyi</i>			1B	July-Sept.	Occurs in serpentine seeps and streams in chaparral, woodland, and broadleaf upland forest habitat.	Of the 12 Marin County occurrences, 10 are situated within the Mt. Tamalpais Watershed
<b>Baker's larkspur</b> <i>Delphinium bakeri</i>	FE	SR	1B	April-July	Occurs in coastal scrub.	Low probability, possibly extinct in California.
<b>Western leatherwood</b> <i>Dirca occidentalis</i>			1B	Jan,-April	Occurs on brushy slopes in mesic sites within mixed evergreen and foothill woodland communities between 30 and 550 meters in elevation. Generally on greenstone.	Populations are known to occur within the Mt. Tamalpais watershed .
<b>Bottlebrush grass</b> <i>Elymus californicus</i>			4	May-Aug.	Occurs in broadleafed upland forest, cismontane woodland, North Coast coniferous forest, and riparian woodland habitats.	Within the Mount Tamalpais watershed, populations have been observed just north of Pilot Knob, between Fish Grade and Filter Plant Roads, in Willow Meadow, and between Peters Dam and the north end of Bolinas Ridge.
<b>Tiburon buckwheat</b> <i>Eriogonum luteolum</i> var. <i>caninum</i>	FSC		3	June-Sept.	Occurs on serpentine slopes. Elevation 10-500 meters.	Species is present and abundant on Mt. Tamalpais watershed. Specific location information currently not available.

**Table 5: Special Status Plant Species with Potential to Occur on the Watershed**

Common name Scientific name	Listing Status			Flowering Period	Habitat Preferences	Potential for Occurrence on the Watershed
	Federal	State	CNPS			
<b>Marin western flax</b> <i>Hesperolinon congestum</i>	FT	ST	1B	April-July	Serpentine barrens and serpentine grasslands in chaparral and valley and foothill grassland habitat. Elevation 5-370 meters .	Of the 13 reported Marin County occurrences, 3 are situated in the Mt. Tamalpais watershed.
<b>Santa Cruz tarplant</b> <i>Holocarpha macradenia</i>	FT	SE	1B	Jun-Oct	Coastal prairie, valley & foothill grassland, coastal scrub; clay or grassland.	Grassland habitat on-site, but thought to be extirpated in Marin County.
<b>Santa Rosa thin-lobed horkelia</b> <i>Horkelia tenuiloba</i>			1B	May-July	Occurs in sandy soils and mesic openings in coastal scrub and chaparral habitat between 50 and 500 meters in elevation.	All five documented occurrences are within the Mt. Tamalpais watershed.
<b>Tamalpais lessingia</b> <i>Lessingia micradenia</i> var. <i>micradenia</i>			1B	July-Nov	Occurs in road cuts and openings in serpentine grasslands and serpentine chaparral.	Of the four documented occurrences, three are in the Mt. Tamalpais watershed.
<b>Marsh microseris</b> <i>Microseris paludosa</i>			1B	Apr-June	Occurs in closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland.	Historic occurrences on Mt. Tamalpais.
<b>Marin County Navarettia</b> <i>Navarettia rosulata</i>			1B	June-July	Occurs in open, dry rocky slopes and grassy areas in closed-cone coniferous forest and chaparral habitats. Often associated with serpentine.	Of the ten documented Marin occurrences, six are located in the Mt. Tamalpais watershed.
<b>Gairdner's yampah</b> <i>Perideridia gairdneri</i> var. <i>gairdneri</i>			4	June-July	Occurs in moist soils of flats, grasslands, stream sides and pine forests.	One occurrence has been documented in the Mount Tamalpais watershed.
<b>White-rayed pentachaeta</b> <i>Pentachaeta bellidiflora</i>	FE	SE	1B	March-May	Open, dry rocky slopes and grassy area, often on soils derived from serpentine rock, between 35 and 620 meters in elevation.	Although none of the documented occurrences are located in the Mt. Tamalpais watershed, the species has been reported in the vicinity and potentially suitable habitat does exist on MMWD lands. All known populations in Marin County have been extirpated.
<b>California pinefoot</b> <i>Pityopus californica</i>			4	May-June	Occurs in mixed coniferous forests.	One occurrence has been documented in the Mount Tamalpais watershed

**Table 5: Special Status Plant Species with Potential to Occur on the Watershed**

Common name Scientific name	Listing Status			Flowering Period	Habitat Preferences	Potential for Occurrence on the Watershed
	Federal	State	CNPS			
<b>Hoover's sempahore grass</b> <i>Pleuropogon hooverianus</i>		SC	1B	May-August	Occurs in wet, grassy, usually shady areas and freshwater marsh associated with broadleaved upland forest, meadows and seeps, and north coast coniferous forest habitats between 10 and 1150 meters in elevation.	Of the 4 documented Marin populations, one occurs in the Mt. Tamalpais watershed but is presumed extirpated. Potentially suitable habitat is present elsewhere on Mt. Tamalpais
<b>Nodding semaphore grass</b> <i>Pleuropogon refractus</i>			4	May-August	Occurs in meadows and mixed evergreen forest.	One historic occurrence of this species on Mt. Tamalpais has been reported. The species has not be observed recently is presumed absent from the watershed.
<b>Mount Tamalpais oak</b> <i>Quercus parvula</i> var. <i>tamalpaiensis</i>			1B	NA	Occurs in lower montane coniferous forest between 100 and 750 meters in elevation.	All documented occurrences are in the Mt. Tamalpais watershed. This species is difficult to distinguish from other oaks in the area. Its taxonomy remains in dispute.
<b>Lobb's aquatic buttercup</b> <i>Ranunculus lobbii</i>			4	Feb.-May	Occurs in vernal pools and mesic sites in cismontane woodland, North Coast coniferous forest, and valley and foothill grassland.	Historic occurrences widespread throughout Marin. Several documented occurrences on Mt. Tamalpais, but no recent verifications
<b>Victor's gooseberry</b> <i>Ribes victoris</i>			4	Mar-Apr	Occurs in canyon forests, redwood forest, and chaparral.	Present in the Mt. Tamalpais watershed.
<b>Marin checkerbloom</b> <i>Sidalcea hickmanii</i> var. <i>viridis</i>			1B	June-July	Occurs in serpentine or volcanic soils in chaparral habitat between 0 and 430 meters. Sometimes appears after burns.	Of the three documented Marin occurrences, one is located on Big Carson Ridge in the Mt. Tamalpais watershed. This species was last observed following a 1954 fire. Additional potential habitat does occur on Mt. Tamalpais.
<b>Tamalpais jewelflower</b> <i>Streptanthus batrachopus</i>			1B	May-June	Occurs on talus serpentine outcrops in closed-cone coniferous forest and chaparral habitats between 410 and 650 meters in elevation.	All five documented occurrences are within the Mt. Tamalpais watershed
<b>Mt. Tamalpais jewelflower</b> <i>Streptanthus glandulosus</i> var. <i>pulchellus</i>			1B	May-June	Occurs on serpentine slopes in chaparral and valley and foothill grassland habitats between 150 and 800 meters in elevation.	Endemic to Marin County. Of the 16 documented occurrences, six are located on MMWD lands. Endemic to Marin County.

**Table 5: Special Status Plant Species with Potential to Occur on the Watershed**

Common name <i>Scientific name</i>	Listing Status			Flowering Period	Habitat Preferences	Potential for Occurrence on the Watershed
	Federal	State	CNPS			
<b>Showy Indian clover</b> <i>Trifolium amoenum</i>	FE		1B	April-June	Associated with serpentine soils, open sunny swales, roadsides and eroding cliff faces in coastal bluff and valley and foothill grassland habitats between 5 and 560 meters in elevation.	Endemic to Marin County. None of the four documented occurrences are within the Mount Tamalpais watershed. However, potentially suitable habitat does exist.

1. Scientific names, common names, and habitat notes from Hickman (1993) and Tibor (2001).
2. Potential for occurrence derived from California Natural Diversity Data Base (CDFG 2004b), Tibor (2001), Howell (1970), CalFlora database (2004) and other sources.

**U.S. Fish and Wildlife Service designations:**

- FE Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.  
 FT Threatened: Any species likely to become endangered within the foreseeable future.  
 SC Species of concern: Other species of concern to the Service.  
 SLC Species of local concern: Species of local or regional concern or conservation significance.

**California Department of Fish and Game designations:**

- SE Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.  
 ST Threatened: Any species likely to become endangered within the foreseeable future.

**California Native Plant Society designations:**

- 1B Plants rare, threatened or endangered in California and elsewhere.  
 2 Plants rare, threatened or endangered in California, but more common elsewhere.  
 3 Plants for which more information is needed – a review list.  
 4 Plants of limited distribution – a watch list.

- Kent Trail Staircase (slide area) – no Special Status Species found (March 2004)
- Concrete Pipe Road – *Amorpha californica* was located (May 2002)
- International Trail - *Streptanthus glandulosus* ssp. *pulchellus*, *Streptanthus batrachopus*, *Calamagrostis ophitidis*, *Navarretia rosulata*, and *Calochortus umbellatus* were located (May 2002)
- Kent Pump Road - *Amorpha californica* and *Elymus californicus* were located (April and August 2002)
- Pine Mountain Road from San Geronimo Ridge Road to Big Carson Creek - *Streptanthus glandulosus* ssp. *pulchellus*, and *Cirsium hydrophilum* var. *vaseyi* were located (July 2001)
- Mill Valley Air Force Base - *Arctostaphylos hookerii* var. *montana*, *Streptanthus glandulosus* ssp. *pulchellus*, *Eriogonum luteolum* var. *caninum*, and *Calamagrostis ophitidis* were located (July 2001)

In addition, general floristic surveys were conducted for additional roads and trails. MMWD staff is confident that any Special Status Species flowering during the time these general surveys were conducted are not present (or, if they are present, they have been mapped). Future projects in these areas would require surveys for Special Status Species that would not have been evident during the earlier surveys. The locations surveyed are listed below:

- Azalea Meadow Trail - no Special Status Species found in May 2004
- Lagunitas Rock Spring Road from Ridgecrest Boulevard to Potrero Meadow - *Arctostaphylos hookerii* var. *montana* and *Streptanthus glandulosus* ssp. *pulchellus* (May 2004)
- Old Stage from West Point Inn to Bootjack - *Streptanthus glandulosus* ssp. *pulchellus*, *Cirsium hydrophilum* var. *vaseyi*, *Calamagrostis ophitidis*, *Navarretia rosulata*, and *Calochortus umbellatus* (May 2004)
- Rock Spring Trail – *Arctostaphylos hookeri* var. *montana* and *Quercus parvula* var. *tamalpaiensis* (May 2004)
- Ridgecrest Boulevard from Mountain Theater parking lot to Lagunitas-Rock Spring Road intersection - *Arctostaphylos hookeri* var. *montana*, *Streptanthus glandulosus* ssp. *pulchellus*, and *Aspidotis carlotta-halliae* (May 2004)
- Indian Fire Road – *Quercus parvula* var. *tamalpaiensis* (March 2004)
- Lakeview Road/Pilot Knob Trail - no Special Status Species found (April 2003)
- Barth's Retreat - *Calochortus umbellatus*, *Arctostaphylos hookeri* var. *montana*, and *Zygadenus micranthus* (May 2002)

- Simmons Trail - *Arctostaphylos hookeri* var. *montana* and *Calochortus umbellatus* (May 2002)
- Benstein Trail - *Streptanthus glandulosus* ssp. *pulchellus* (May 2002)
- Azalea Hill (existing trail only) - *Lessingia microdenia*, *Arctostaphylos hookerii* var. *montana* and *Navarretia rosulata* (April 2002)
- Verna Dunshee Trail - no Special Status Species found (April 2001)
- Sky Oaks Trail - no Special Status Species found (April 2001)
- Pilot Knob Trail - no Special Status Species found (April 2001)
- Shaver Grade Road - no Special Status Species found (January 2001)

Finally, several project sites included in the Draft Plan were surveyed for Special Status Species of Plants since April 2003. No Special Status Species were found at the following sites (numbered per the Draft Plan site numbering system): Nos. 2057 and 2066 on Old Stage Road; Nos. 2040-41 and 2050-52 on Old Railroad Grade Road; No. 226 on Bullfrog Road; and No. 257 at Bon Tempe Dam Parking Lot. *Cirsium hydrophilum* var. *vaseyi* and *Arctostaphylos hookeri* var. *montana* were found at Site No. 2063 on Old Stage Road.

Sites not previously surveyed would need additional surveying to identify locations of Special Status Species of plants.

### **3. Wetlands and Waters of the U.S.**

Section 1.7 of this EIR describes the regulations governing wetlands and the filling of wetlands. The Watershed does not contain many wetlands. Most wetlands are in flat areas, of which there not many on the Watershed. Wetlands occur in the Potrero Meadow area and nearby flat areas on the north side of Mt. Tamalpais including Hidden Lake, High Marsh, Lily Lake, Willow Meadow, Rock Spring, Colier Spring, Liberty Spring, and Lagunitas Creek below Alpine Dam. Other wetlands are formed around small seeps or springs or are seasonal wetlands that form in small depressions and swales. The perennial and intermittent streams draining the Watershed are considered "waters of the U.S."

## **B. Potential Impacts and Mitigation Measures**

### **Criteria Used For Determining Impact Significance**

A project will typically have a significant impact on plants if it meets any of the following criteria:

- 3.2a Has a substantial adverse effect, either directly or through habitat modification on any species identified as a candidate, sensitive, or Special Status Species in local or regional

plans, policies, or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service. (Assessed in Impacts 3.2-A through 3.2-D.)

- 3.2b Has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service. (Assessed in Impacts 3.2-E through 3.2-G.)
- 3.2c Has a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. (Assessed in Impact 3.2-H.)
- 3.2d Conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan. (There is no adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan for the Watershed. Thus, the project has no impact as regards this criterion.)

**Impact 3.2-A                    Construction of erosion control projects included in the Draft Plan could require removal of Federal or State threatened, endangered, or rare species of plants.**

The two plant species that have legal status under either the FESA or CESA have relatively limited ranges on the Watershed. As shown on Figures 10 to 12, three populations of *Hesperolinon congestum* (Marin dwarf flax) occur on Azalea Hill, along the southern end of Pine Mountain Road, and near the northeast corner of the Watershed. The existing Azalea Hill Road passes through the Azalea Hill population. This road is stable, and no projects are proposed in the area where the Marin dwarf flax is located. The Draft Plan recommends rerouting the Azalea Hill Trail, but the rerouting would be southeast of the area that supports the Marin dwarf flax population. The rerouting would not be expected to affect this plant. However, to ensure that the rerouting project does not impact unmapped plants of this species, the District will conduct botanical surveys of the area where the reroute may be located to ensure that no Marin dwarf flax are affected. The Draft Plan recommends five projects on Pine Mountain Road where it passes through the area populated by Marin dwarf flax. Four of these projects involve installing rolling dips in the road surface and the fifth is to outslope 61 feet of road. As this work would occur within the existing roadbed, it would be unlikely to affect Marin dwarf flax. However, it is possible that the heavy equipment work could grade roadside plants, including Marin dwarf flax. This would be a **potentially significant impact**.

There is a questionable report of an occurrence of a single individual of *Ceanothus masonii* (Mason's ceanothus) at the south end of the Old Sled Trail. There have subsequently been repeated unsuccessful efforts to locate and confirm this occurrence. The Draft Plan calls for replacing the culverts beneath Bolinas-Fairfax Road where this trail starts. A review of the fill crossing that supports the road shows that there are no ceanothus located on that fill slope. The Draft Plan also calls for constructing a new stream ford along Old Sled Trail within the vicinity of the reported Mason's ceanothus. Constructing a ford within the stream channel would



not affect the ceanothus. The main population of this plant is along Bolinas Ridge Road, and no projects are proposed in this area. Therefore, the impacts to this species will be **less than significant**.

#### **Mitigation Measures**

- 3.2-A.1 Prior to finalizing construction plans for each project, a qualified botanist will survey the area to be disturbed for Marin dwarf flax, Mason's ceanothus, Baker's larkspur, Santa Cruz tarplant, white-rayed pentachaeta, Hoover's semaphore grass, and other Federal or State listed plant species, unless the area has been previously surveyed by the MMWD Vegetation Ecologist.
- 3.2-A.2 All projects will be designed to avoid any Marin dwarf flax, Mason's ceanothus, or other Federal or State listed plant species (if subsequent surveys find these species on the Watershed).
- 3.2-A.3 For projects near known populations, the individual plant will be identified for protection with flagging and construction monitoring will occur to ensure that there will be no adverse impacts to the populations.

#### **Impact Significance After Mitigation**

The recommended mitigation measures ensure that all plants protected under the FESA and CESA will not be affected by the project. The mitigations will reduce the potential impact to Federal and State listed plant species to a **less than significant level**. Subsequent impact discussions refer to impacts to other Special Status Species of plants and notes that in some cases these plants may need to be removed. Mitigation is recommended when this removal is necessary. These assessments and mitigations do **not** apply to Federal and State endangered, threatened, and rare plant species. These species shall not be removed as stated above.

#### **Impact 3.2-B Construction of erosion control projects included in the Draft Plan could require removal of other Special Status Species of plants.**

Construction of many projects (about 380 project sites) would occur in areas high potential to support plants on one of the CNPS lists of special status plants, including (numbers should be considered approximate; see Figures 10-13):

- 2 sites on Yolanda Trail;
- 7 sites on Pine Mountain Road;
- 24 sites on Bolinas-Fairfax Road
- 8 sites on Old Sled Trail
- 7 sites on San Geronimo Ridge Road
- 4 sites on Oat Hill Road
- 15 on Rocky Ridge Road
- 40 sites on Kent Pump Road
- 5 sites on Kent Trail
- 7 sites on Stocking Trail

- 26 sites on Lagunitas-Rock Springs Road
- 2 sites on Lagoon Fire Road
- 3 sites on Laurel Dell Road
- 2 sites on Barth's Retreat Road
- 2 sites on Mickey O'Brien Trail
- 1 site on Cataract Trail
- 8 sites on Simmons Trail
- 3 sites on Benstein Trail
- 13 sites on East Ridgecrest Boulevard
- 1 site on International Trail
- 1 site on Eldridge Grade Road
- 3 sites on Collier Springs Trail
- 7 sites on Lake Lagunitas Road
- 1 site on Lakeview Road
- 1 site on Shadyside Trail
- 2 sites on Sky Oaks Road
- 2 sites on Redwood Spring Trail
- 3 sites on Middle Peak Road
- 4 sites on Northside Trail
- 11 sites on Rock Spring Trail
- 8 sites on Old Stage Road
- 3 sites on Nora Trail
- 5 sites on Hog Back Road
- 8 sites on Gravity Car Road
- 3 sites on Hoo-Koo-E-Koo Trail
- 6 sites on Old Railroad Grade Road
- 35 sites on non-system trails

Many of these projects include installation of rolling dips or other work that should not affect plant life. As described under Impact 3.2-A, a number of these roads and trails have already been surveyed for Special Status Species by MMWD staff. It is possible that constructing some of these projects could eliminate plants included in the CNPS *Inventory of Rare and Endangered Vascular Plants of California*. Destruction of these plants would be considered a **potentially significant impact**.

### **Mitigation Measures**

- 3.2-B.1 Project sites not yet surveyed for Special Status Species shall be surveyed prior to final project design.
- 3.2-B.2 To the maximum degree feasible, projects will be designed and constructed to avoid eliminating other Special Status Species of plants. Where avoidance of these Special Status Species of plants is unavoidable, then MMWD shall reestablish the plants that are eliminated. Efforts should be made to collect and preserve propagules from the affected population for later reintroduction. Reintroduction can occur near the disturbed area or in other suitable habitat where the species would benefit from

reintroduction (e.g., on decommissioned roads and trails or, for reroutes, the old trail/road that is being abandoned, if there are suitable soils and habitat).

- 3.2-B.3 The District will conduct regular training for its permanent and seasonal construction crews in Special Status Species and environmentally sensitive habitats so they are more likely to prevent accidental environmental impacts to these resources. (Also see Mitigation Measure 3.1-B.14.)
- 3.2-B.4 The District shall monitor construction to ensure that plants scheduled for avoidance are protected during the construction process.
- 3.2-B.5 The District will retain records of all surveys and the locations of all special status plants identified at project sites so that these plants can be avoided during construction of any future projects in the area. Roadside plants that could be harmed by normal maintenance activities shall be flagged or otherwise marked so that equipment operators and other staff are aware of their presence and avoid them.

### ***Impact Significance After Mitigation***

The recommended mitigation measures should protect most CNPS-listed species from destruction. However, it is possible that some critical projects may not be able to totally avoid such plants. The mitigation measures provide for reintroduction of representatives of the species affected. It is concluded that few plants should be affected and that some to many of these may be reintroduced. The advantages to the various plant communities from reducing erosion also mitigates for what is expected to be a small loss of these species. The mitigation measures and the ecological benefits deriving from the project reduce the impacts to other Special Status Species of plants to a ***less than significant level***.

### **Impact 3.2-C            Decommissioning roads and trails could require removal of other Special Status Species of plants.**

Decommissioning roads and trails can include recontouring portions of the road or trail by excavating fillslopes and pulling them back up onto the road or trail to restore the natural grade. This can result in loss of vegetation on the fillslope and potential loss of vegetation on the adjacent cutslope (since excavated fillslope material would be placed against the cutslope. Most roads and trails slated for decommissioning are in areas that do not contain known Special Status Species. The following roads/trails targeted for decommissioning do pass through areas with Special Status Species (but not listed species):

- Hog Back Road is entirely within an area that contains sensitive species;
- Lagoon Fire Road is entirely within an area that contains sensitive species; and
- Upper Berry Trail is almost entirely within an area that contains these species.

Neither road nor the trail have been surveyed for the presence and location of Special Status Species. Decommissioning activities along these roads could result in the loss of plants on CNPS Lists. This would be a ***potentially significant impact***.

## **Mitigation Measures**

The mitigation measures recommended for Impact 3.2-B also apply to this impact. In addition:

- 3.2-C.1 When decommissioning roads, MMWD shall survey the areas to be disturbed for Special Status Species. Areas supporting such plants will not be included in fillslope/cutbank decommissioning unless such decommissioning is critical to repair potentially failing fillslopes that would deposit sediment into streams or decommissioning is essential to closing the route or to restoring the integrity of the habitat, *and* revegetation of such species is feasible.

## **Impact Significance After Mitigation**

The recommended mitigation measures should protect most CNPS-listed species listed from destruction. However, it is possible that decommissioning certain areas of active, significant erosion may not be able to totally avoid such plants. The mitigation measures provide for reintroduction of representatives of the species affected. It is concluded that few plants should be affected and that some to many of these may be reintroduced. The advantages to the various plant communities from reducing erosion also mitigates for what is expected to be a small loss of these species. The mitigation measures and the ecological benefits deriving from the project reduce the decommissioning impacts to other Special Status Species of plants to a ***less than significant level***.

**Impact 3.2-D Construction of trail and road reroutes, conversion of certain roads to smaller roads or trails, and/or adoption of certain non-system trails as part of the trail system could result in removal of other Special Status Species of plants.**

The trails proposed for rerouting that are in areas containing Special Status Species of plants are the upper portion of the route between Oat Hill Road and Carson Falls, the Potrero Meadow Trail, the Laurel Dell to Barth's Retreat Road, and the Azalea Hill Trail. If these trails were not sited and constructed to avoid Special Status Species of plants, these reroute projects would have a ***potentially significant impact*** on those plants. Each recommended reroute is discussed below.

**Old Sled Trail** is an existing trail. Technically, it is not a reroute, but rather an adoption of this route over an existing trail to the east. The trail is a hiking trail and not an equestrian trail. As such, it will not be necessary to widen the existing trail, so there should be no impact on Special Status Species that occupy the area through which this trail passes.

**Azalea Hill Trail** currently passes through a stand of serpentine chaparral. The trail would be rerouted to the north to avoid this stand of serpentine chaparral. The serpentine chaparral stand that the existing trail passes through contains Special Status Species. Closing the section of trail that passes through this stand would reduce the impacts of future trail widening (since the trail has become incised in sections to the point where users may seek a parallel route). There is a non-system trail that travels further south through the chaparral stand. This trail descends a steep, serpentine grassland nose below the chaparral, and then travels through

grassland and an oak woodland to reach the trail along the west side of Bon Tempe Creek at the bottom of the hill (not far downstream from where the official trail intersects this trail). As part of the trail reroute, this trail should be actively decommissioned as it passes through sensitive habitat, is overly steep in a few sections, and causes erosion. The reroute would pass through native grassland and some oak woodland. While it is not expected that the reroute area supports Special Status Species of plants, this would need to be confirmed by surveys prior to final trail layout.

**Potrero Meadow Trail** is a non-system trail that will be adopted as part of the system and rerouted to protect the meadow. The trail currently passes through the upper and low meadows. It will be rerouted to the meadow edge and/or into the adjoining woodland. The route could affect Special Status Species inhabiting the meadow edge.

**Barth's Retreat Access Road** is a 540-foot access road between Lagunitas-Rock Springs Road and Barth's Retreat that is overly steep and eroding. MMWD proposes to close the road and construct a trail connection. If the trail were built in the chaparral on either side of the road, it could affect Special Status Species of plants.

### **Other Actions**

Several existing roads would be converted to smaller roads (Class IV) or to trails. These conversions should not require any removal of vegetation outside the already disturbed roadbed and should not have an impact on Special Status Species. Paving the approximately 0.5 mile long Bon Tempe Road would not be expected to affect roadside vegetation. This broad gravel-surfaced road is relatively flat as it traverses restored meadows and some oak savanna between the paved Sky Oaks Road and the parking areas near the bottom of Bon Tempe Dam. It is expected that the road is wide enough that it should not need to be widened (25-30 feet wide). It is not expected that paving this road would require disturbance of roadside vegetation, and it would not have a significant impact on Special Status Species of plants. Adoption of certain non-system trails as part of the trail system could generate additional use of these trails, since, once adopted as system trails, they may be included on official maps and in guidebooks. However, these trails are already well-established and relatively heavily used, which is why they were recommended for inclusion in the trail system. The increase in use is not expected to be substantial and would not be expected to result in substantial widening of existing trail tread. Adoption of these trails would not be expected to have a significant impact on Special Status Species.

### **Mitigation Measures**

The same mitigation measures recommended for Impact 3.2-B apply. In addition;

- 3.2-D.1 The area where the new trail section for the Potrero Meadow Trail, Laurel Dell to Barth's Retreat Trail, and Azalea Hill Trail could be constructed will be surveyed for the presence and location of Special Status Species of plants.
- 3.2-D.2 To the maximum degree feasible, the location for the new trail shall be selected to avoid destruction of Special Status Species of plants. Where avoidance is not feasible, then revegetation per Mitigation Measure 3.2-B.2 shall apply.

- 3.2-D.3 The Azalea Hill Trail reroute shall be rerouted to avoid the stand of serpentine chaparral. The non-system trail that proceeds south of the Azalea Hill Trail shall be decommissioned.
- 3.2-D.4 The new trail from Laurel Dell Road to Barth's Retreat should be routed through the Douglas fir woodland to the west of the chaparral area that borders the existing access road.

### ***Impact Significance After Mitigation***

The recommended mitigation measures should protect most species listed on one of the CNPS lists from destruction. However, it is possible that new trail construction may not be able to totally avoid such plants. The mitigation measures provide for reintroduction of representatives of the species affected. In addition, the abandoned section of trail would be available for natural reintroduction of these species. It is concluded that few plants should be affected and that some to many of these may be reintroduced. The mitigation measures and the ecological benefits deriving from the project reduce the impacts of new trail construction to Special Status Species of plants to a ***less than significant level***.

### **Impact 3.2-E Construction of erosion control projects included in the Draft Plan could result in measurable degradation of sensitive habitats.**

Most projects included in the Draft Plan are relatively limited in size. For example, removing a stream crossing to replace the culvert or repairing a streamside landslide would destroy vegetation growing on that fillslope, but this is a relatively small component of the streamside or riparian vegetation in the area. In addition, one of the primary reasons for replacing the culvert is to ensure that the entire fill crossing does not fail during a major storm event. In that case, the vegetation would also be lost. However, work in a stream channel could result in damage to trees that are not slated for removal, and this would be a ***potentially significant impact***. Loss of trees is expected to be minimal. For example, a survey of the fill crossings that would need to be removed and replaced along Concrete Pipe Road from Bolinas-Fairfax Road to Five Corners showed the need to possibly remove one oak tree. The remainder of the vegetation that would be affected was grass, forbs, and a few ferns.

Improving road drainage (e.g. installing rolling dips) and installing new ditch relief culverts would be expected to have minimal effects on the vegetation. Managing gully erosion generated by road and trail runoff would have a ***beneficial*** impact on vegetation, since gullying removes vegetation.

### ***Mitigation Measures***

Mitigation Measures 3.1-B.1-8,12-14, 17-18, and 20-24 apply to this impact, In addition, the following mitigation measures are required.

- 3.2-E.1 All projects shall be designed and constructed to remove only that native vegetation needed to accomplish the erosion control objectives. MMWD shall monitor work to ensure only targeted plants are removed.
- 3.2-E.2 Standing trees, snags and stumps greater than one foot in diameter at breast height shall not be damaged or undercut unless authorized by the MMWD Resource Specialist.

### ***Impact Significance After Mitigation***

While some of these projects, particularly removal of stream crossings when installing new culverts, will require removal of native vegetation, the overall amount of vegetation that would be lost is quite small when compared to the 19,000+ acres of native plant habitat on the Watershed. Over the long term, the species that currently occupy these fills, landslides, and other affected sites will re-establish themselves, so there would be no long-term impact on species composition or diversity. The mitigation measures recommended above minimize plant loss and would speed the recovery process. The mitigation measures would reduce the impact to riparian and other sensitive vegetation types to a ***less than significant level***.

### **Impact 3.2-F Decommissioning roads and trails could result in a loss of sensitive habitats.**

Decommissioning approximately 10,332 feet of road (calculated at 25 feet wide for the roadbed and adjacent graded areas) and 5,200 feet of trail (calculated at 4 feet wide) will result in about 6.5 acres of restored, natural habitat. This is a ***beneficial*** impact of the project.

Decommissioning roads and trails can include recontouring portions of the road or trail by excavating fillslopes and pulling them back up onto the road or trail to restore the natural grade. This can result in loss of vegetation on the fillslope and potential loss of vegetation on the adjacent cutslope (since excavated fillslope material would be placed against the cutslope). This could result in the loss of mature trees, though District staff has indicated that sites would be assessed on a site-by-site basis and where large trees are present, the slope would not need to be disturbed, so long as it does not pose a risk of failure thereby depositing sediment into a stream. The loss of mature trees would be considered a ***potentially significant impact*** since large trees are used by a variety of species of wildlife and are valuable in their own right (which is why for development projects under the jurisdiction of the County of Marin, the County requires compliance with a tree ordinance for removal of mature trees). Decommissioning also involves removing all stream fill crossings to restore to a natural streambed. This will result in removal of vegetation growing on that fill similar to the impact discussed under Impact 3.2-E. However, the only roads or trails specifically identified for decommissioning in the Draft Plan that has stream crossings are the roads below Peter's Dam.

An example of road decommissioning is the unnamed road that traveled north from the lower part of Grassy Slope Road to San Geronimo Ridge Road. This road was decommissioned in the summer of 2002 with some final work done in autumn 2004. All crossings were excavated. Straw or erosion fabric was placed on the slopes. The roadbed was decompacted. Sidecast material was pulled back on the road for full decommissioning in most locations, though some

locations received partial decommissioning or installation of cross drains. Forest litter was scattered over the surface and, where available, limbs and dead trees were scattered over the top. In areas adjacent to grasslands, the topsoil containing grass seed was pulled back over the top of the decommissioned bed.

The following describes the general vegetation along roads and trails recommended for decommissioning.

**Lagoon Road** - approximately 3,400 feet of this road would be decommissioned. This road follows the top of a northwest-trending ridge from Lagunitas-Rock Springs Road to its northwest terminus at the Lagoon Extension Trail. Starting at this northwest terminus, the road is bordered by manzanita-dominated serpentine chaparral, a sensitive community. There are no significant cutslopes or fillslopes in this area, so that decommissioning would likely require either no action or possibly decompacting the road surface to expedite recolonization by adjacent manzanita and other shrubs. There are some short sections where there are more pronounced cutslopes 2-3 feet high. However, the fillslopes on the other side of the road are heavily vegetated with manzanita and other shrubs. Moving the fill slopes back onto the roadbed would require removal of a substantial number of mature manzanita shrubs. This decommissioning is not needed since once the chaparral recolonizes the roadbed, the minor topographic break caused by past road grading would not be noticeable. Most of the road is graded along the ridgeline and does not have pronounced cutslopes or fillslopes. As the road travels southeast, it passes through areas where Douglas fir is invading the chaparral, and then through an area with taller chaparral (more sandstone in the soil). Here, there is another area with a cutslope 2-3 feet high on the north side of the road. The fillslope on the other side of the road is, again, heavily vegetated with manzanita and other shrubs. It would require a major removal of mature shrubs to pull the fillslope back onto the roadbed.

As the road enters a wooded area, there is a cutslope on the south side of the road that could be pulled back onto the roadbed without requiring removal of substantial vegetation. There are a few California bay that either could be left or removed without causing a significant impact on the habitat. The road then reaches an intersection with Cross County Boy's Trail. Here, there is a Douglas fir forest to the south and a mix of chaparral and Douglas fir on the north. There is a berm along both sides of the road here that could be graded out without requiring removal of vegetation. This would not be a high priority.

**Upper Berry Trail** - about 2,000 feet of this trail would be decommissioned due to erosion, steepness, and trail redundancy. The southern end of this trail starts on Lagunitas-Rock Springs Road north of Rifle Camp. Traveling north, it reached a confusing intersection with the Cross County Boy's Trail and then soon crosses Lagoon Fire Road. North of Lagoon Fire Road, it again intersects and ends at the Cross County Boy's Trail. The trail passes mainly through a mature Douglas fir forest. There are no stream crossings that would need to be removed on this trail. Decommissioning would not require any major movement of earth, though some duff will be moved in the upper part of the trail. Rather, it would likely only require signing and possibly barriers. There would be no impact on vegetation from decommissioning this trail.

**Lower Portion of Grassy Slope Road** - approximately 2,000 feet of this steep road would be decommissioned. The road primarily passes through a mature second-growth mixed conifer forest comprised of Douglas fir, tanoak, bay, madrone with a few live oak, big-leafed maple, and



buckeye. There are two sections where the road borders a large grassland area. There is a fillslope on the downhill side of almost all the road. Mature trees (except in the grassland area) are generally 5-10 feet from the edge of the road. The fillslopes could be excavated to restore the natural grade without damaging these trees. There are few to no trees on the fillslope itself. The fillslope is covered with duff or supports typical understory plants – poison oak, blackberry, sword ferns, bush monkeyflower. There are no stream crossings that would need to be removed on this road. The Draft Plan states that when this road is decommissioned, the lower portion that travels through the grassland will have the large gully on the uphill side filled, culverts through the road will be pulled, and the road will be outsloped. This could result in some loss of annual grassland near the road edge which would be considered less than significant.

**End of Worn Springs Road** - about 280 feet of the end of this road would be decommissioned. There are no stream crossings that would need to be removed on this road. Decommissioning would likely require only repair of roadbed erosion problems, signing, and perhaps a barrier. There are no cutslopes or fillslopes on this section of the road.

**End of Oat Hill Road** - about 700 feet of this dead-end, spur road would be decommissioned. The road travels across a ridgetop through a mixed evergreen forest comprised of Douglas fir, tanoak, and some California bay and madrone ending in grassland. There are no stream crossings that would need to be removed on this road. The road does not contain substantive cutslopes or fillslopes. Decommissioning would likely consist of signing the road as closed and installing some form of barrier. It could include decompacting the road surface to allow quicker plant recolonization. Decommissioning this road would not be expected to have any impact on surrounding vegetation.

**Laurel Dell Road to Barth's Retreat** – is a 540-foot long road that would be decommissioned. The road passes through serpentine chaparral. Decommissioning would require repair of existing erosion, signing, and a barrier. MMWD may want to decompact the road to allow more rapid colonization by chaparral shrubs that line each side of the road. Decommissioning would not adversely affect vegetation in the area.

**Interior Pine Point Road** - about 1,100 feet would be decommissioned. This road is located on a mainly level lake point. The road traverses a meadow which the District has been restoring by removing non-native pines and conducting prescribed burning. There are a few live oaks and madrones near the road, but mainly the road is in grassland. A mixed evergreen forest borders the grassland. It is comprised mainly of live oaks, madrone, California bay, and some large Douglas fir. The road does not contain cutbanks and fillslopes, so decommissioning should not require disturbance of any vegetation outside the existing roadbed. There are no stream crossings that would need to be removed on this road. At most, the road would be disked or ripped and replanted. Decommissioning of this road should not adversely affect native vegetation.

**Bare Knoll Road** - about 1,700 feet of this road would be decommissioned. The road appears to be an old fire trail graded out across a grass ridgeline. It begins at the Laurel Dell Road just north of Laurel Dell. Starting at Laurel Dell Road, this road gradually climbs (for about 250 feet) through a mature Douglas fir forest (with some California bay and tan oak). As it climbs the small rise there is a cut slope on the west side and a fillslope to the east. The fillslope could be

pulled back onto the road bed without disturbing significant vegetation; most of the fillslope is covered with duff or patches of grass. There are three 16-inch DBH firs on the fillslope; they could either be left (i.e., not remove the fillslope where these trees are) or they could be removed. Removal of these three trees would not significantly affect the vegetation community in the area.

As it nears the top of the ridge, the road is graded across the grassy ridgeline. There is no cutslope or fillslope in the grassy area. There are no stream crossings that would need to be removed on this road. Decommissioning would simply require not grading the road and allowing the adjacent grasses to recolonize the roadbed (a process that is already beginning as MMWD is not currently grading this road).

**Peters Dam (Miscellaneous Roads)** – about 1,200 feet of roads in this area would be decommissioned. The primary roads recommended for decommissioning below Peters Dam are a road that branches off the main west side access road to travel immediately above Lagunitas Creek and ends at the base of the dam with a fork off that road that travels back up to the main west side access road. These roads travel through mature second-growth mixed conifer forest comprised of Douglas fir, redwood, bay, and tan oak with some big-leafed maples and madrone. Understory is primarily duff with sword fern, blackberry, etc. The south end of the road that ends below the dam has willows above the road.

The roads are on a hillside with cutbanks on the uphill side and fillslopes on the downhill side. These fillslopes do not support substantial vegetation and are primarily duff-covered or vegetated with berries and other common vegetation. However, there are large trees growing along the toe of the fillslopes, generally about 5-8 feet from the edge of the road. In some cases, the fill was pushed to extend past downslope trees, so the mature trees grow up through the lower part of the fillslope. In most cases, it appears that the fillslope could be excavated without damaging mature downslope trees. Staff will need to assess the road sections to determine where fillslope removal should stop so as not to affect mature trees.

**Ridge Trail** - about 3,500 feet would be decommissioned. This trail is located in the Deer Park area. The Draft Plan recommends decommissioning because it is overly steep at each end and it is not needed. Decommissioning this trail would not require grading of earth and would not have any effect on vegetation. Decommissioning would likely be restricted to signing and placement of barriers. If minor grading to pull the dirt on each side of the trail over the incised trailbed was done, it would only disturb grassy or non-vegetated trail edges and would not have a significant effect on the habitat.

**Lower Portion of Telephone Trail** - about 1,750 feet of this trail below the State Park boundary would be decommissioned. The trail passes through mature sandstone-based chaparral, comprised mainly of manzanita, scrub live oak, and chamise with some ceanothus, toyon, yerba santa, and chaparral pea. The trail is essentially a tunnel through these dense 8-14 foot tall shrubs. The trail is exceedingly steep in some locations. Decommissioning the trail would likely consist of removing the trail bed for 1-25 feet at its intersection with the Temelpa Trail so that people stay on Temelpa Trail. Otherwise decommissioning could include construction of some water bars and other erosion control actions. The trail cannot be completely decommissioned as it provides access to the telephone poles that carry the telephone line to the top of Mt.

Tamalpais. This decommissioning would not be expected to have any impact on the surrounding chaparral vegetation.

### **Mitigation Measures**

Mitigation Measures 3.1-B.11-24 and the mitigation measures recommended for Impact 3.2-E apply to this impact. In addition:

- 3.2-F.1 Decommissioned roads and trails should be covered with native mulch available in the site area. MMWD may also collect seeds of plants or live plants common to the area and revegetate the disturbed slope. Decommissioned sections should be ripped or otherwise treated to encourage the establishment of seeds or seedlings. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in the latest version of the *California Salmonid Stream Habitat Restoration Manual*.
- 3.2-F.2 In locations where there are mature trees on fillslopes or cutslopes, MMWD should make every effort to preserve those trees unless the banks where these trees are growing pose a significant risk of failure.
- 3.2-F.3 Pulling fillslopes back onto the roadbed or trailbed is not recommended for the portions of Lagoon Road that pass through serpentine chaparral or for Upper Berry Trail.

### **Impact Significance After Mitigation**

These decommissioning activities could remove vegetation within sensitive natural communities. However, it is expected that these species would re-establish themselves on the recontoured slopes. Over time, the decommissioning would provide additional habitat available for plants of these communities. Few, if any, mature trees would be removed per Mitigation Measure 3.2-F.2. The loss of a small number of trees where their removal is essential to realize other Plan goals would be considered less than significant given the tens of thousands of trees present on the nearly 20,000-acre Watershed. Thus, the long-term impact to sensitive communities is considered **beneficial**. The short-term impacts would be reduced to a **less than significant level** by preserving mature trees and speeding the revegetation process through implementing the mitigation measures recommended above.

**Impact 3.2-G      Construction of road and trail reroutes, conversion of certain roads to smaller roads or trails, and/or adoption of certain non-system trails as part of the trail system could result in a loss of sensitive habitats.**

Rerouting several road and trail sections will reduce erosion and the potential for gullying, thereby benefiting the plant community through which the road or trail travels. Constructing the new trail and road sections will necessarily require the removal of vegetation. The following summarizes the vegetation in the area where the reroutes are proposed:

**Azalea Hill** - two sections of the existing 4,075 feet of trail will be rerouted and built to horse trail standards (Class VI Trail). The trail would make use of the existing fire road beginning at Bolinas-Fairfax Road. This road passes through the area where the Marin dwarf flax population is located. At the end of the existing road, the trail travels south through a stand of serpentine chaparral and then turns east traveling downhill. As it passes through the chaparral heading downhill, the trail tread has become incised, quite deeply in several locations, leading to erosion and loss of habitat. The trail soon leaves the chaparral stand and traverses down a grass hillside to an oak woodland forest that stretches to near the bottom of the hill. The oak forest is comprised primarily of coast live oak with some black oak, Oregon oak, madrone, and California bay.

The trail would be rerouted to address the steep sections near the top and to avoid the trail passing through the stand of serpentine chaparral. The reroute could start in the grassland further to the north and switchback through grassland and/or the adjacent oak woodland to join the existing trail in the grassland section before it enters the oak woodland. Downhill of this point, the trail is stable and passes through a mature oak woodland; this section would not need to be rerouted. At the bottom of the hill the trail intersects a trail that runs along the west side of Bon Tempe Creek. The trail crosses the creek to access Bull Frog Road at an area that contains a sensitive wet meadow habitat. This last part of the trail would be rerouted downstream to provide a stream crossing at a less sensitive area. There is an existing trail along the west side of Bon Tempe Creek, so the route would mainly be a matter of appropriate signing and some improvements at the finally selected crossing.

The reroute at the top of the trail may require construction of 500-1,000+ feet of new trail. The trail would be constructed through native perennial grassland and possibly through a portion of the adjacent (downhill) oak woodland (both sensitive plant communities). The trees in the oak woodland are spaced relatively far apart so new trail construction should be able to avoid mature and even immature trees. Some native grassland would be lost. It is not expected that this grassland supports Special Status Species, but this would need to be confirmed in pre-design site surveys.

**Bald Hill Trail** – the existing 540 feet of this trail is actually a road between Five Corners and the trail portion of Bald Hill Trail. This overly steep section will be converted to an equestrian trail (Class VI Trail) and rerouted. The trail has an elevation climb of 80 feet. The reroute would need to be about 1,100 feet long to maintain a 7.5% grade. There are no Special Status Species in this area. The road is bordered by open woodlands and grass, with many live oaks at the top and more California bay towards the bottom. The road climbs a relatively narrow nose, so rerouting may require rather tight switchbacks. This reroute could be built without cutting any trees and would not have an effect on vegetation, including oak woodlands, in the area. The District may wish to consider meandering a trail down the existing roadbed rather than constructing a trail through undisturbed areas. While the trail would be steep, it is a relatively short section, and it would not be steeper than many other trails on the Watershed.

**Deer Park Trail** – about 280 feet of the end of Worn Spring Road would be decommissioned. The portion of the road recommended for decommissioning provides access between Deer Park Trail, Buckeye Trail, and the portion of Worn Springs Road that would be maintained. To continue to provide this connection, a new trail would be constructed. A field survey indicated that such a trail could begin at the end of Deer Park Trail, proceed about 50 feet up the road

(this section is not steep nor eroding and could be used as a trail), and then proceed east on Buckeye Trail. After proceeding on Buckeye Trail for 100-250 feet, a new trail could be constructed on the hillside to connect to Worn Springs Road at the ridgeline. The trail would need 1 to 3 switchbacks to climb the hillside (depending on how steep the District wants the trail to be). The new trail would be 300-500 feet in length. The hillside the trail would traverse is vegetated with a mix of native and non-native grasses and herbs. There are no Special Status Species reported for this area. The loss of 1,200-2,000 square feet of this vegetation type would not be considered a significant impact. No sensitive plant communities would be significantly affected.

**Junction Trail** - the bottom of this trail where it parallels a creek will be rerouted to cross the creek on a bridge to avoid sedimentation of the creek. There are no Special Status Species of plants here. Only about 120 feet of trail will be rerouted, and it is all fairly level, so probably about 150 feet of new trail would be constructed. This minor rerouting would not be expected to result in the loss of any trees or shrubs and would not have a significant effect on the vegetation, including oak woodlands and riparian habitat, in the area.

**Upper Canyon Trail** – the existing 1,300 feet of trail will be built to equestrian standards (Class VI Trail) and rerouted. It would require about 2,100 feet of trail to realize an average 7.5% grade. The trail traverses the west side of an intermittent stream channel between Concrete Pipe Road and the junction of Canyon Trail and Boy Scout Road. This trail contains a number of deeply incised sections likely caused by horse use. There are no Special Status Species in the area of the existing trail or the reroute area. Where the trail hits the bottom of the ridge, there are mature second-growth redwoods. The general vegetation is an open California bay forest with a few madrones and Oregon oak (oak woodland). Due to the relatively steep hillside in some locations, rerouting may need to include trail construction on the east side of the stream channel (riparian habitat), with bridges across the channel. The open nature of the woodland should allow trail construction without the need to remove trees. For some trail sections, the reroute would likely use some of the existing trail. Construction of this reroute should not have a significant impact on vegetation or sensitive plant communities.

**Boy Scout Road** - the lower portion will be converted to a trail. The roadbed is relatively stable with substantial rock in the bed and 5 rolling dips. There are redwoods at the bottom of the canyon below the road. Trees above the roads and below the road as it climbs towards the ridge are mainly California bay with a few Oregon and live oaks, and broom. Near the top of the ridge, there are more live oaks. It is recommended that the future trail be constructed within the existing roadbed. It can meander along the roadbed. Using the existing roadbed would eliminate the need to cut a new trail, thereby eliminating impacts to vegetation and to redwood and oak woodlands.

**Barth's Retreat Access Road** – is a 540-foot access road between Lagunitas-Rock Springs Road and Barth's Retreat that is overly steep and eroding. This road would be closed, and a new trail would be constructed to provide access to Barth's Retreat. The existing road is bordered on the east side by serpentine chaparral (dominated by chamise and manzanita) and a large serpentine barrens area bordered by chaparral and Sargent's cypress. The west side also contains chaparral with a Douglas fir woodland further to the west. The trail reroute should not be built through the serpentine barrens area to the east. A preferred route would be through the Douglas fir woodland (dominated by Douglas fir in the 18-inch DBH range and some

California bay) to the west. This area has relatively gradual slopes and widely spaced large trees. A trail could be developed here that would require removal of no or only small Douglas fire and tan oaks. Construction of a trail in this location would not be expected to have any significant impacts on vegetation or sensitive plant communities.

**Little Carson Trail System** – there are three trails that access the head of Carson Falls from Oat Hill Road. The easternmost is a signed trail and is relatively heavily used. It has several steep sections and shows active erosion in several sections. People traveling to and from Pine Mountain Road to the east use this trail to access Carson Falls and points to the west. The trail descends through perennial grassland to the head of Carson Falls. The Draft Plan recommends decommissioning of this trail. Decommissioning this trail would require repair of several existing erosion sources. If the trail is signed and blocked to use, it is expected that the surrounding grasses and herbs would soon recolonize the trail tread. Decommissioning would not have any adverse impacts on the vegetation.

The next trail to the west is a lightly used trail, likely mainly used by people ascending from Bolinas-Fairfax Road on a non-system trail. This trail descends gradually through perennial grassland and meets the trail described above just above the head of Carson Falls. It has a good grade, and does not show any substantial erosion problems. The westernmost trail is part of the Old Sled Trail. This trail is also very lightly used (based on trail tread width). This trail travels through grasslands, hardwood evergreen forest, and serpentine chaparral. It intersects the trail described above just above where the joined trails meet the easternmost trail just above the head of Carson Falls. The grade is gradual, and there is no substantial erosion. MMWD proposes to "adopt" the route that will have the least environmental impact. It is recommended that the middle route would have the fewest impacts.

The trail from the head of the falls to Big Trees is a steep trail that descends the north side of the Little Carson Creek canyon, often quite near the creek. Some people use this trail to access the pools in the central part of the Carson Falls complex and the large pool at the base of the falls. Use of the base of the falls is problematic since this pool is used as a breeding location for yellow-legged frogs (see subsequent discussion under Impact 3.3-B). Downstream of the falls, the trail is steep (quite steep in some stretches), but rerouting of this trail would involve constructing a major trail project up the ridge to the north.

It is recommended that the trail along the length of Carson Falls be well signed to limit access to the falls in order to protect yellow-legged frogs. No new trails would need to be constructed in this area, so the rerouting/decommissioning of trails here would not have any adverse impacts on Special Status Species or common species of plants. Any changes to the trail route between the head and base of the falls will be done to be consistent with the District's goals for yellow-legged frog protection and sediment reduction goals.

**Potrero Meadow Trail** is a non-system trail that will be adopted as part of the system and rerouted to protect the meadow (native perennial grassland). The trail is about 1,920 feet long. Starting at Potrero Camp, the trail currently passes through the lower meadow to the north of the center of the meadow. It then passes, through a section of upland forest and then through the upper meadow, again to the north of the center of the meadow. In the lower meadow, there is a south-forking branch that traverses the meadow to a terminus on Lagunitas-Rock Springs Road. This branch should be closed and decommissioned as it passes through the meadow and

is not needed. MMWD's concept is to move the trail out of the meadow to the grassland/forest edge along the north side of the meadow. This would allow hikers to continue to have views of the meadow while protecting the more sensitive habitat nearer the center of the meadow.

Constructing a trail along the meadow edge would require removal of some native grasses and possibly some small trees. It is estimated that about 1,600 feet of new trail would be needed. The woodland bordering the meadow is a mixed evergreen woodland dominated by live oak, tan oak, and Douglas fir. The loss of a few small trees and some grassland along the edge of the meadow would not constitute a significant loss of vegetation, and the loss would be compensated for by the recolonization of grasslands in the more sensitive parts of the meadow.

## Summary

The reroutes could require constructing about 2,000-3,000 feet of new trail (depending on whether some reroutes use existing road beds and how much of existing trail sections would be incorporated into trail reroutes). Calculated at a rate of 5 feet of disturbance per foot of trail (disturbed width to construct a Class VI Trail), the new trails would remove about one-third acre of vegetation. It is likely that the abandoned portions of the roads/trails would approximately equal this disturbed acreage. Over time, these abandoned sections could be expected to revegetate with species common to the surrounding area. As such, there would not be a long-term adverse impact to plant community composition, diversity, or abundance. However, over the short term, there would be an impact on these communities since the old trail/road would still be unvegetated and the new trail would remove additional plants. This is a short-term ***potentially significant impact.***

Unless trails are properly constructed to be able to support equestrian use, they can degrade to where erosion becomes a significant problem (e.g., the reason that Upper Canyon Trail needs to be rerouted). As trails become incised, they tend to widen as users avoid incised areas. This can result in additional loss of vegetation. This is a potentially significant impact. However, MMWD has the authority to close trails and roads for health, safety, maintenance, or management reasons, as described on pages 5.6 to 5.7 of the Draft Plan. The District will continue to monitor trail use on the Watershed and close trails where equestrian (or any other type of use) is causing damage to the trail. Such monitoring and temporary closures are beneficial to the environment and to all users, as it reduces the chance of trail damage which can result in safety hazards and possible permanent trail closure due to environmental degradation.

Paving the approximately 0.5 mile long Bon Tempe Road would not be expected to substantially affect roadside vegetation. This broad gravel-surfaced road is relatively flat as it traverses restored meadows and some oak savanna between the paved Sky Oaks Road and the parking areas near the bottom of Bon Tempe Dam. It is expected that the road is wide enough that it should not need to be widened (25-30 feet wide). It is not expected that paving this road would require any disturbance of roadside vegetation. Conversion of several roads to smaller roads or trails would not be expected to affect roadside vegetation. Adoption of certain non-system trails as part of the trail system could generate additional use of these trails, since they may be included on official maps and in guidebooks. However, these trails are already well-established and relatively heavily used trails, which is why they were recommended for inclusion in the trail system. The increase in use is not expected to be substantial and would not be expected to

result in substantial widening of existing trail treads. Adoption of these trails would not be expected to have a significant impact on sensitive vegetation.

### **Mitigation Measures**

Mitigation Measures 3.1-B.12-24 apply to this impact. In addition, the following measures are recommended:

- 3.2-G.1 To the degree feasible, MMWD shall lay out the new trail locations to avoid mature trees, mature shrubs, or other sensitive or unique plant specimens. All wetlands shall be avoided other than where it is necessary to cross a stream.
- 3.2-G.2 Class VI trails will be constructed according to accepted equestrian trail standards.
- 3.2-G.3 MMWD should consider constructing the reroutes of the bottom of Boy Scout Road and the Bald Hill Trail on the existing roadbed.
- 3.2-G.4 The easternmost trail connection between Oat Hill Road and the head of Carson Falls shall be closed and decommissioned. A sign shall be installed explaining the closure and directing the user 0.1 mile to the middle trail access to Big Trees. A sign shall be installed at the Old Sled Trail junction with Oat Hill Road directing people 0.1 mile to the middle trail access to Big Trees. The District could use Carson Falls as the destination on these signs rather than Big Trees; however, it may result in less use of the sensitive Carson Falls area if it were not emphasized on signing.
- 3.2-G.5 The Potrero Meadow Trail reroute shall be constructed along the interface of the meadow and the woodland to the north. In constructing the trail, healthy trees over 8 inches in diameter (DBH) shall be retained. The south-forking trail in the lower meadow shall be closed and decommissioned.

### **Impact Significance After Mitigation**

New trail sections will require removal of vegetation. However, the abandoned trail and road sections will be decommissioned and revegetated. The amount of habitat that will be revegetated will approximately equal the amount of habitat lost from new trail construction. This equivalent habitat replacement along with the other recommended mitigation measures reduce the impacts from new trail construction on sensitive habitats to a less than significant level. The mitigation measures also reduce the accidental damage to trees to a less than significant level. Overall, with implementation of these mitigation measures, the impacts to sensitive plant communities, and all Watershed vegetation, would be **beneficial** in the long term, and reduced to a **less than significant level** for short-term construction impacts.

### **Impact 3.2-H Construction of projects included in the Draft Plan could result in loss of wetlands.**

For projects included in the Draft Plan, wetland areas of concern are limited to places where the roads or trails have a level section or are adjacent to springs. Because of the Watershed's steep



terrain, there are only a few level areas, such as below Bon Tempe Dam and the lower end of Shaver Grade and at Potrero Meadow and Laurel Dell. Because the project focuses on road and trail drainage, the only locations where minor wetland impacts could occur is around culverts, in roadside ditches, and around springs adjacent to a road or trail. The District has not mapped wetlands, so the discussion of potential impacts to the various wetlands remains general. Specific wetlands will be identified in the field prior to developing the contract or scope of work for each project. The potential impact areas are discussed below.

### *Culverts*

Wetlands can develop around the ends of culverts, especially the uphill end, where improper drainage of the upslope roadside ditch or stream channel has resulted in standing water that forms hydric soils and/or supports wetland vegetation. It is likely that most of these wetlands are the result of manmade road and trail drainage improvements. In a few locations where roads cross relatively level areas, a culvert under the road may be draining an uphill swale/wetland. In those cases, the District proposes to retain the inlet end of the culvert at the same elevation to maintain the hydrologic regime of the uphill wetland. This would allow revegetation of the areas disturbed by culvert replacement. Replacement of culverts will require removal of vegetation at the inlet and outlet ends of the culvert. However, this would be a temporary impact, and this wetland vegetation would be expected to quickly recolonize the disturbed area.

The only wetlands that might be lost are small, isolated wetlands (that are not part of a natural upslope wetland systems as described above) that have formed at the inlet ends of culverts due to inadequate culvert placement and drainage. With culvert replacement, it is possible that the drainage conditions that formed these small wetlands will be changed so that wetlands may not reform at the culvert ends. This is expected to result in a small loss of isolated wetlands.

Road and trail decommissioning includes outslowing the road or trail, removing inboard ditches, and removing all stream crossings and relief culverts. This could result in the loss of a few wetlands that have resulted from improper culvert placement. However, the drainage for all natural wetlands would be retained or returned to their natural pattern. It is possible that these small, isolated wetlands could be retained without compromising the overall goals of decommissioning.

### *Roadside Ditches*

There are some locations where wetland vegetation has become established in inboard road (and possibly a few trail) ditches. In some of these locations, the Draft Plan may call for cleaning or filling the ditch and redirecting runoff to more efficiently drain the upslope side of the road or trail. These actions may temporarily or permanently eliminate the ditch wetland habitat. It is not expected that a substantial amount of ditch wetland habitat would be lost since most ditches requiring action are on steeper slopes (where erosion is most likely to occur), and these ditches would be unlikely to support wetland habitat (as the water drains quickly from these ditches). Most of the significant ditch wetland habitat is in areas that are relatively flat, where the water does not drain well. These areas generally are not targeted for erosion repair since they do not cause substantial erosion. The loss of these isolated ditch wetlands is necessary to realize the objective of the Draft Plan to create a storm-proofed road and trail system. The impact would

be tempered by the fact that the water that may have resulted in a wetland community in the ditch would be redirected to its natural channel, thereby enhancing the potential for additional or enhanced wetland habitat along that natural channel.

### *Springs*

There are several locations where runoff from springs uphill of the road or trail flow along roadside ditches prior to traveling beneath the road or trail via a culvert (or, in a few cases, flowing across the road or trail). The District proposes to retain all these natural spring-fed wetlands. If the wetland plants are disturbed by the need to repair the road surface or replace a culvert, every attempt will be made to minimize the loss of wetland vegetation. The hydrology of the wetland will be retained, that is, the inboard ditch will be retained to maintain the wetland. If there is a location where a new ditch relief culvert is recommended near one of these wetlands, the District will design this project to maintain the existing amount of wetland habitat.

Decommissioning roads and trails could remove wetland habitat caused by springs. Removing inboard ditches could eliminate wetland habitat that has resulted from the inboard ditch capture of the flow from the spring. While decommissioning would return the flow to a more natural channel, there still could be some loss of wetlands resulting from some decommissioning activities.

### *Waters of the U.S.*

In addition to wetlands, many projects will occur within stream channels which transport "waters of the U.S." which are regulated by the Army Corps. Of the 776 creek crossing sites inventoried when preparing the Draft Plan, 566 are recommended for some form of treatment. These treatments would affect approximately 9,824 feet of creek. Twenty-five (25) of the creek crossing sites are on routes that are planned for decommissioning or on non-system routes where the crossings will be removed without having to be replaced, so all the existing fill at these crossings would be removed from creek channels. This would result in a net removal of 1,515 cubic yards of fill, covering a 5,881-square foot area, from creeks on the Watershed. A complete "fill removed" minus "fill put back" calculation for all the sites results in a much larger amount of fill removed from the creek crossings because the new, upgraded crossings will be constructed with larger culverts and lower road surfaces to prevent diversions. The amount of actual creek channel below ordinary high waterline that would be restored is estimated to be 290 feet long with a surface area of 480 square feet. The additional creek channel is a beneficial impact of the project.

The actual work within stream channels would be regulated by the Army Corps as discussed previously in Section 1.7 of this EIR. It is expected that these projects would be covered under one or more Nationwide Permits. The projects would result in short-term erosion and plant impacts as discussed in other impact discussions. Overall, the impact to the "waters of the U.S." would be beneficial since there would be more "waters" and because the water quality of the streams would be enhanced.

## Summary

The additional creek channel provided by decommissioning and reducing the size of stream fill crossings will more than compensate for the potential loss of small, isolated wetlands occurring at or near culvert ends and in roadside ditches. However, the loss of these wetlands is considered a **potentially significant impact** which should be minimized to the maximum extent possible.

## Mitigation Measures

All the mitigation measures recommended for Impact 3.1-B apply to this impact. In addition, the following mitigations are required.

- 3.2-H.1 Prior to designing or finalizing construction documents/plans for each project, a field survey of the project site shall be conducted by a qualified wetland expert. This expert shall identify all Army Corps jurisdictional wetlands and wetlands subject to RWQCB oversight. These wetland delineations and identifications shall be submitted to the Army Corps, California Department of Fish and Game, and the RWQCB when submitting the annual list of projects to be carried out the following year.
- 3.2-H.2 All wetlands created by springs shall be maintained to the maximum degree feasible. If the drainage of the spring must be altered to allow proper road or trail drainage, the District shall strive to create a drainage pattern that provides an equal or greater amount of wetland habitat in the area of the spring.
- 3.2-H.3 Any roadside ditch wetlands will be assessed by the District to determine whether they can be retained. Unless displacement of these wetlands is critical to reducing a substantial erosion problem, these wetlands will be retained.
- 3.2-H.4 When removing culverts for replacement, the minimum amount of vegetation shall be removed. No equipment should be allowed within any wetland.
- 3.2-H.5 Culverts draining upslope wetlands shall be placed so that the inlet is set at the same elevation as the existing culvert to maintain the upslope hydrologic regime.
- 3.2-H.6 When decommissioning roads and trails, all wetlands should be retained unless their retention would cause substantial future erosion.
- 3.2-H.7 All ditches supporting wetlands shall be clearly identified so that ongoing road and trail maintenance avoids grading or cleaning these ditches except where needed to restore ditch function.
- 3.2-H.8 Where wetland plants must be removed or wetland habitat is created, the District shall collect seed from wetland plants in the area and reseed the area once construction is complete. Suitable live plants can also be planted. Planting techniques can include seed casting, hydroseeding, or live planting methods using

the techniques in the latest version of the *California Salmonid Stream Habitat Restoration Manual*.

- 3.2-H.9 The District shall abide by any additional permit conditions required by the Army Corps, California Department of Fish and Game, and the RWQCB.
- 3.2-H.10 To ensure there is no net loss of wetlands due to the project, the District is committed to creating approximately 290 feet of new creek as the result of the road and trail decommissioning called for in the Draft Plan. The unavoidable impact of loss of isolated wetlands in in-board ditches due to road re-contouring (subject to Mitigation Measures 3.2-H.1 and 3.2-H.3) shall be assessed, quantified, and calculated for size, condition, function, and value of the ditch wetlands. The loss of isolated, in-board ditch wetlands shall not exceed the 290 feet of new creek that will be created. Once the threshold is reached, no additional wetlands shall be displaced or impacted without further environmental analysis and mitigation.

### ***Impact Significance After Mitigation***

The mitigation measures recommended above along with provisions of the Draft Plan would result in a minimal loss of wetlands. Virtually all spring-fed wetlands would be retained or maintained at the same size. Wetlands upstream of culverts would generally be maintained. Those wetlands that could be filled would mainly be small, isolated wetlands that occur in roadside ditches. Mitigation Measure 3.2-H.10 ensures there will be no net loss of wetlands on the Watershed due to Plan implementation. The 290 feet of additional creek generated by the project would more than offset the amount of wetlands that would be filled. The impact to wetlands and the "waters of the U.S." would be reduced to a ***less than significant*** level, though responsible agencies could require additional mitigations.

### **Impact 3.2-I Project construction can spread undesirable non-native plant species.**

The use of bulldozers, excavators, dump trucks, backhoes, and other motorized equipment can spread the seed of broom and other undesirable non-native plant species. These seeds can be spread by directly pushing soil containing these seeds into new areas along roads, by baring earth in areas where the seeds are already in the seedbed, and by transporting seeds on vehicle tracks, wheels, blades, etc. The large populations of broom existent on the Watershed have primarily resulted from past heavy equipment operations.

The spread of broom, yellow starthistle, pampas grass, and other undesirable species is a ***potentially significant impact***. Once established, these plants can displace native species, adversely affected the natural plant communities.

### ***Mitigation Measures***

- 3.2-I.1 Invasive exotic weed populations in and adjacent to project sites will be treated prior to any soil disturbing activities to minimize the seed dispersal of those plants. Sites

where imported gravel or other fill materials are installed or stored should be mapped and monitored to prevent the introduction of new weeds.

- 3.2-1.2 MMWD shall monitor project sites and remove new exotic weeds spread into the site area by project construction.
- 3.2-1.3 Monitoring and/or treatment of these sites shall occur quarterly, or until it has been determined that there is no longer a risk of an unintentional release of an invasive, exotic species.

### ***Impact Significance After Mitigation***

These mitigation measures should ensure that erosion control and other actions recommended in the Draft Plan do not result in the unintentional spread of broom or other undesirable nonnative species. The mitigation measures would reduce the impact to a ***less than significant level***.

### **3.3 WILDLIFE**

#### **A. Setting**

##### **1. Wildlife on the Watershed**

The varied plant communities on the Watershed support an equally varied suite of animals. Watershed wildlife was inventoried and studied in detail when MMWD prepared its *Mount Tamalpais Vegetation Management Plan*. The wildlife studies done for that plan predicted 287 terrestrial vertebrate species could occur on the Watershed; this includes 202 birds and 54 mammals, and 21 reptiles and amphibians (see Leonard Charles and Associates and Wildland Resource Management, 1991; Technical Appendix for a list of all animals). Most species of wildlife inhabiting the Watershed are species common to the general region.

More recently, MMWD has contracted with the Point Reyes Bird Observatory (PRBO) to monitor songbirds on the Watershed. The monitoring done in 2001 indicated increased mean diversity and richness of songbirds from that recorded in previous years (1996-1998) at many sampling areas. A total of 90 bird species were documented during the census (see Holmes et al, 1998 and Flannery et al, 2002 for a list of the birds censused). The District also has contracted for inventories of red-legged frogs, yellow-legged frogs, bats, western pond turtles, and osprey.

The following summarizes expected wildlife use of the main Watershed vegetation types

##### *Redwood and Douglas Fir Forest*

These coniferous forests support similar compositions of wildlife including amphibians such as Pacific giant salamander and rough-skinned newt and reptiles such as northern alligator lizard and western terrestrial garter snake. Bird species include northern spotted owl, osprey, northern saw-whet owl, hairy woodpecker, western wood peewee, Steller's jay, chestnut-backed chickadee, winter wren, golden-crowned kinglet, and hermit warbler. Small to medium-sized mammals include opossum, Pacific shrew, Trowbridge shrew, mountain beaver, dusky-footed woodrat, and raccoon. Bobcats, black-tailed deer, and an occasional mountain lion use the habitat.

##### *Sargent's Cypress Forest*

This habitat supports a less diverse assemblage including Pacific giant salamander, western toad, Pacific tree frog, western fence lizard, western skink, southern alligator lizard, ringneck snake, sharp-tailed snake, racer, common kingsnake, western terrestrial garter snake, and western rattlesnake. The area is not extensively used by breeding birds, but red-tailed hawks, great-horned owls, Steller's jays, orange-crowned warbler, purple finch, and others will nest here. Typical mammals using the forest include western gray squirrels, western harvest mice, deer mice, dusky-footed woodrat, gray fox, raccoon, striped skunk, black-tailed deer, and bobcat.

### *Mixed Conifer Hardwood Forests*

The mixed forest type provides more food than the true conifer forest. This forest provides habitat for Pacific giant salamander, rough-skinned newt, western toad, western fence lizard, western skink, southern alligator lizard, ringneck snake, racer, gopher snake, western terrestrial garter snake, western terrestrial aquatic snake, and western rattlesnake. Birds using the forest include turkey vulture, osprey, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, golden eagle, American kestrel, band-tailed pigeon, barn owl, western screech owl, Anna's hummingbird, acorn woodpecker, northern flicker, western wood peewee, scrub jay, plain titmouse, white-breasted nuthatch, house wren, varied thrush, solitary vireo, yellow-rumped warbler, hermit warbler, fox sparrow, and house finch. Small mammals that commonly occur would include Pacific shrew, Trowbridge shrew, brush rabbit, black-tailed hare, California ground squirrel, deer mouse, pinyon mouse, and dusky-footed woodrat. These forests provide habitat for several bat species including little brown myotis, Yuma myotis, long-eared myotis, fringed myotis, long-legged myotis, big brown bat, and red bat. Carnivores that frequent these forests include gray fox, raccoon, striped skunk, bobcat, and mountain lion.

### *Hardwood Forests*

Oak woodlands are one of the most diverse and productive habitats. About 28 amphibians and reptiles are expected to occur here including rough-skinned newt, California newt, arboreal salamander, western toad, Pacific tree frog, foothill yellow-legged frog, western fence lizard, western skink, southern alligator lizard, ringneck snake, racer, gopher snake, common kingsnake, western terrestrial garter snake, western terrestrial aquatic snake, night snake, and western rattlesnake.

A wide variety of birds use these woodlands for foraging and cover. These include the wood duck, turkey vulture, California quail, mourning dove, common poorwill, whitethroated swift, Anna's hummingbird, Allen's hummingbird, Lewis woodpecker, acorn woodpecker, Nuttall's woodpecker, downy woodpecker, hairy woodpecker, northern flicker, western wood-pewee, Pacific-slope flycatcher, ash-throated flycatcher, western kingbird, violet-green swallow, Steller's jay, scrub jay, American crow, plain titmouse, bushtit, white-breasted nuthatch, Bewick's wren, house wren, ruby-crowned kinglet, blue-gray gnatcatcher, Swainson's thrush, wren, northern mockingbird, loggerhead shrike, orange-crowned warbler, yellow-rumped warbler, Townsend's warbler, rufous-sided towhee, chipping sparrow, fox sparrow, golden-crowned sparrow, dark-eyed junco, western meadowlark, house finch, and lesser goldfinch.

A number of small mammals and bats commonly inhabit and forage in these woodlands and they include Virginia opossum, long-eared myotis, fringed myotis, long-legged myotis, California myotis, silver-haired bat, western pipistrelle, big brown bat, red bat, hoary bat, Townsend's big-eared bat, pallid bat, Brazilian free-tailed bat, black-tailed hare, Sonoma chipmunk, California ground squirrel, western gray squirrel, deer mouse, and dusky-footed woodrat.

Common predatory birds and mammals that hunt or nest in these habitats are black-shouldered kite, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, golden eagle, American kestrel, merlin, peregrine falcon, gray fox, ringtail, raccoon, long-tailed weasel, badger, striped skunk, mountain lion, and bobcat. Mountain lions frequent oak woodlands because of the relatively high number of deer and availability of hunting cover that occur in this habitat.

The oak woodland and oak savanna habitats are preferred by black-tailed deer as they provide a diversity of food plants and cover for reproduction. Additionally, the mast or acorn drop in the fall is considered an important dietary component for deer and wild pig in California.

### *Riparian Woodland*

Riparian woodlands are exceptionally productive habitats in that they function as escape cover, thermal cover, migration corridors, nesting, and foraging habitat for a diverse vertebrate community. Twenty-nine species of amphibians and reptiles, 135 species of birds and 51 species of mammals are expected to use the riparian woodlands on the MMWD lands.

Commonly occurring amphibians and reptiles include Pacific giant salamander, rough-skinned newt, California newt, California slender salamander, Pacific tree frog, western pond turtle, western fence lizard, western skink, southern alligator lizard, rubber boa, ringneck snake, sharp-tailed snake, race, California whipsnake, common kingsnake, common garter snake, western terrestrial garter snake, western aquatic garter snake, night snake, and western rattlesnake.

These woodlands provide valuable nesting and foraging habitat for a number of birds such as black-crowned night heron, wood duck, hooded merganser, turkey vulture, California quail, band-tailed pigeon, mourning dove, Anna's hummingbird, Allen's hummingbird, belted kingfisher, Lewis woodpecker, acorn woodpecker, northern flicker, Pacific-slope flycatcher, black phoebe, ash-throated flycatcher, violet-green swallow, tree swallow, barn swallow, plain titmouse, white-breasted nuthatch, Bewick's wren, winter wren, golden-crowned kinglet, Swainson's thrush, varied thrush, northern mockingbird, warbling vireo, yellow warbler, yellow-rumped warbler, rufous-sided towhee, chipping sparrow, dark-eyed sparrow, lesser goldfinch, and evening grosbeak.

Small mammals and bats that commonly nest or forage in riparian woodlands include Virginia opossum, vagrant shrew, ornate shrew, Pacific shrew, broad-footed mole, shrew mole, little brown myotis, Yuma myotis, long-eared myotis, fringed myotis, long-legged myotis, California myotis, silver-haired bat, western pipistrelle, big brown bat, red bat, hoary bat, Brazilian free-tailed bat, Sonoma chipmunk, California ground squirrel, western gray squirrel, western harvest mouse, deer mouse, pinyon mouse, dusky-footed woodrat, California vole, and Norway rat. Additionally, deer and wild pigs frequently use these areas for foraging and escape cover.

The abundance of small birds and mammals results in a relatively high diversity of avian and mammalian predators that typically hunt these woodlands. These predators include the osprey, black-shouldered kite, sharp-shinned hawk, Cooper's hawk, red-shouldered hawk, rough-legged hawk, American kestrel, merlin, common barn owl, western screech owl, great horned owl, northern pygmy, long-eared owl, northern saw-whet owl, gray fox, ringtail, raccoon, long-tailed weasel, striped skunk, mountain lion, and bobcat.

### *Chaparral and Coastal Scrub*

Chaparral and coastal scrub habitats include appropriate cover and forage for a wide variety of wildlife species but are generally less diverse than oak woodland and riparian woodland habitats. Several amphibians and reptiles are commonly found in these shrubby habitats



including California newt, Pacific tree frog, bullfrog, western fence lizard, coast horned lizard, western skink, southern alligator lizard, ringneck snake, sharp-tailed snake, racer, gopher snake, common kingsnake, common garter snake, western terrestrial garter snake, western aquatic garter snake, night snake, and western rattlesnake.

Birds that use these habitats for nesting or foraging include turkey vulture, California quail, band-tailed pigeon, mourning dove, common poorwill, Anna's hummingbird, Lewis woodpecker, ash-throated flycatcher, scrub jay, bushtit, house wren, rock wren, ruby-crowned kinglet, hermit thrush, wrentit, California thrasher, orange-crowned warbler, yellow-rumped warbler, Wilson's warbler, rufous-sided towhee, California towhee, lark sparrow, sage sparrow, fox sparrow, golden-crowned sparrow, and dark-eyed sparrow.

A number of small mammals and bats reside or forage in these shrubby habitats including Virginia opossum, Yuma myotis, long-eared myotis, California myotis, western pipistrelle, big brown bat, red bat, pallid bat, brush rabbit, back-tailed hare, Sonoma chipmunk, California ground squirrel, Botta's pocket gopher, western harvest mouse, deer mouse, pinyon mouse, and dusky-footed woodrat. These habitats are also commonly used by deer and wild pigs. However, the more dense and mature stands will support lower densities of these large mammals than the earlier seral stages.

The abundance of birds and small mammals in these habitats supports a wide variety of avian and mammalian predators. The more common predators include black-shouldered kite, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, golden eagle, American kestrel, western screech owl, northern pygmy owl, long-eared owl, gray fox, ringtail, raccoon, long-tailed weasel, badger, western spotted skunk, striped skunk, mountain lion, and bobcat.

#### *Perennial and Annual Grassland*

These habitats provide a wide variety of wildlife species with necessary life history requirements. Grasslands generally support fewer amphibians and reptiles than the forest or woodland habitats but some commonly occurring ones are California tiger salamander, California slender salamander, western toad, Pacific treefrog, western fence lizard, coast horned lizard, western skink, racer, gopher snake, common kingsnake, common garter snake, western terrestrial garter snake, western aquatic garter snake, night snake, and western rattlesnake.

The ample seed source produced by the annual and perennial grasses and insect life provides food for California quail, killdeer, mourning dove, white-throated swift, northern flicker, black phoebe, Say's phoebe, western kingbird, horned lark, tree swallow, cliff swallow, barn swallow, northern mockingbird, loggerhead shrike, rufous-crowned sparrow, lark sparrow, savannah sparrow, western meadowlark, Brewer's blackbird, pine siskin, lesser goldfinch, and American goldfinch.

Small mammals are also prevalent in these grassland habitats. Such species as the vagrant shrew, ornate shrew, brush rabbit, black-tailed hare, California ground squirrel, Botta's pocket gopher, California kangaroo rat, western harvest mouse, deer mouse, pinyon mouse, California vole, and house mouse either burrow in the rocky soil or build nests and runways through the taller grasses in search of small insects and seeds. Bats such as Yuma myotis, western

pipestrelle, big brown bat, red bat, pallid bat, and Brazilian free-tailed bat forage over these open habitats particularly along woodland or shrubby ecotones.

Abundant populations of small to medium sized birds and mammals also attract predatory birds and mammals such as black-shouldered kite, northern harrier, sharp-shinned hawk, red-tailed hawk, ferruginous hawk, rough-legged hawk, golden eagle, American kestrel, merlin, peregrine falcon, common barn owl, western screech owl, great horned owl, burrowing owl, long-eared owl, short-eared owl, gray fox, long-tailed weasel, badger, striped skunk, and bobcats.

## **2. Special Status Species**

Special status species are taxa listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration – Fisheries (NOAA - Fisheries), or California Department of Fish and Game (CDFG), taxa designated as candidates for listing, or any species of concern or local concern by USFWS, NMFS, and/or CDFG. Special-status species of California include:

- Plant and animal species designated as threatened, or endangered under Section 4 of the Federal Endangered Species Act;
- Species designated as rare, threatened, or endangered by California Department of Fish and Game under the California Endangered Species Act;
- Species that are recognized as candidates for listing by agencies with resource management responsibilities such as USFWS, U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), and California Department of Fish and Game;
- Species defined by the USFWS or CDFG as species of concern;
- Species considered rare, threatened, or endangered pursuant to Section 15380 of the CEQA Guidelines;
- Species protected by California Fish and Game Code Sections 3503, 3503.5 and 3511;
- Species protected by the Federal Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712); and
- Bald and golden eagles protected by the Federal Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668a-d).

Based on wildlife studies done for MMWD's *Mount Tamalpais Vegetation Management Plan* (Leonard Charles and Associates, 1991) and a review of *The Marin County Breeding Bird Atlas* (Shuford 1993; hereafter called the Breeding Atlas), the following Special Status Species could nest on the site. While it is possible that other Special Status Species could occasionally forage on or use the Watershed, they are not expected to nest or breed there. Since projects included in the Draft Plan would not result in loss of natural habitat, the only possible significant effects on terrestrial wildlife would be on nesting birds or breeding animals.

## Birds

The Migratory Bird Treaty of 1918 states that it is prohibited to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. 703)

**Golden Eagle** (*Aquila chrysaetos*) is currently listed as a California Species of Special Concern and a Fully Protected species under the California Fish and Game Code. Protection is also extended to their nests, eggs, and young in California. They are protected under Federal law through the Bald and Golden Eagle Protection Act, 1940 (16 USCISC. 668a-668d) and under the Migratory Bird Treaty Act ((16 USC 703-711) of 1918 *as amended*). Golden eagles are not provided protection under any existing State or Federal endangered species regulations. Their protection is mainly limited to the destruction of the nests, eggs, young, or the birds themselves under the above cited statutes.

The golden eagle is an uncommon permanent resident of much of northern Marin County. It frequents open woodlands as well as mountainous areas in the least populated parts of the county. The Breeding Atlas identifies possible nest sites on the Watershed.

**Osprey** (*Pandion haliaetus*) is considered a California Species of Special Concern. This species feeds primarily on fish but will also take invertebrates and other small vertebrates. Osprey utilize large trees and snags in forest habitats for nesting and cover. They breed from March to September and nest on platforms of sticks up to 250 feet above ground. Nests are built at the top of snags, human-made structures, dead-topped trees, or similar structures within 15 miles of foraging grounds. The Watershed supports a stable population of ospreys centered around Kent Lake. This colony was founded in the mid-1960s and was monitored almost every year from 1981-2000 and in 2003-2004. The colony reached a maximum of 46 active nests in 1994. Since then, the colony size has been stable ranging from 24 to 46 active nests per year. (Avocet Research Associates, 2003).

**Cooper's Hawk** (*Accipiter cooperii*) is listed as Species of Special Concern by the CDFG and is protected under the Migratory Bird Treaty Act. Protection is also extended to their nests, eggs, and young in California. This hawk is a fairly common resident of the woodlands of Marin County. It prefers landscapes where wooded areas occur in patches and groves, facilitating ambush hunting. Preferred nest sites are within dense stands of live oak woodland or riparian areas. Cooper's hawks are rather noisy when nesting, and their nests are not difficult to find. It preys on birds, small mammals, and reptiles. The Breeding Atlas identifies confirmed, probable, and possible nest sites on the Watershed for this species.

**Sharp-shinned Hawk** (*Accipiter striatus*) is listed as a Species of Special Concern by the CDFG and is protected under the Migratory Bird Treaty Act (op. cit.). Protection is also extended to its nests, eggs, and young in California. This hawk is a fairly common resident of the woodlands of Marin County. It prefers semi-open country, at the edges of open woodlands, and

clearings where it preys on small birds. Preferred breeding sites for sharp-shinned hawks are typically within 90 meters of water in dense stands of even-aged trees on north facing slopes. The nests of sharp-shinned hawks are very difficult to find because the hawks are quiet and very secretive when nesting. Nest sites have been confirmed on the Watershed.

**White-Tailed Kite** (*Elanus leucurus*) is a California Fully Protected Species (Fish and Game Code of California §3511 & §3503.5). It nests and perches in dense topped trees and forages in grasslands, agricultural lands, meadows, and marshes. It prefers habitats with low ground cover and variable tree growth. It preys primarily on small rodents, often hovering while hunting before dropping steeply onto their prey. The Breeding Atlas identifies probable nesting sites on the Watershed.

**Northern Spotted Owl** (*Strix occidentalis caurina*) is listed as a Threatened Species under the Federal Endangered Species Act of 1973 (50 CFR §17.11). It is also protected under the Migratory Bird Treaty Act (50 CFR §10.13). The State of California considers the owl a Species of Special Concern, and their eggs, young, and nests are also protected under §3503.5 of California Fish and Game Code. Impacts to the owl and/or its habitat must be mitigated under Federal law through a formal consultation with the U.S. Fish and Wildlife Service (USFWS). A complete and detailed account of the taxonomy, ecology, and reproductive characteristics of the spotted owl is found in *A Conservation Strategy for the Northern Spotted Owl* by the Interagency Scientific Group (Thomas *et al*, 1990) and the final rule designating the spotted owl as a threatened species (U.S. Fish and Wildlife Service, 1990a). A detailed account of the status, distribution, and abundance of the northern spotted owl throughout its range is found in the 1987 and 1990 Fish and Wildlife Service Reviews (U.S. Fish and Wildlife Service, 1987, 1990b). Surveys and monitoring of northern spotted owls on public lands within GGNRA, Muir Woods National Monument, Pt. Reyes National Seashore, Mt. Tamalpais State Park, Samuel P. Taylor State Park, the MMWD Watershed, and lands belonging to the Marin County Open Space District have been ongoing since 1993.

Marin County is the southern limit of the owl's range. MMWD, along with neighboring Federal and State agencies, participates in monitoring owl nesting. Surveys indicate that the County may support one of highest densities of spotted owls nationwide. The owls are typically found in old-growth forests, but in Marin County they reside in second-growth Douglas fir, Bishop pine, redwood, mixed conifer-hardwood, and evergreen hardwood forests as well as remnant old-growth conifer stands. The Watershed contains a number of known nesting sites and owls (Hatach *et al*, 1999); see Figure 14.

**Vaux's Swift** (*Chaetura vauxi*) is an uncommon summer resident of coniferous forests of northern California, a common migrant throughout the state, and a California Species of Special Concern. This species nests in hollowed out trees and snags in heavily forested areas. The Breeding Atlas identifies possible nest sites on the Watershed.

**Allen's Hummingbird** (*Selasphorus sasin*) is a common breeder on the Watershed. Locally, they are known as one of the earliest spring arrivals, appearing as early as mid-January. This species occurs along the humid coastal belt of the California coast from the Oregon border up to 20 miles inland. Typical breeding habitat includes any well-vegetated area with suitable foraging habitat. Nests are built on a tree branch or shrub. Breeding occurs from mid-February

to early August. The species is documented in most sampling locations censused by PRBO in 2001.

**Bewick's Wren** (*Thryomanes bewickii*) is a Federal Species of Concern. It was found along almost all trails censused by PRBO in 2001, and the Breeding Atlas indicates it nests throughout most of the Watershed. It inhabits chaparral.

**California Thrasher** (*Toxostoma redivivum*) is a Federal Species of Concern. It is a rare breeder in Marin County. This species feeds on fruits, berries, insects, spiders, and other terrestrial invertebrates. California thrashers forage by scratching and digging in the soil with their long down-curved bills. Nests are normally built in trees or shrubs 2-5 feet above the ground. Pairs are typically monogamous, solitary, and rarely leave the breeding area. Populations are declining along coastal areas due to increasing development. The PRBO census identified the species on the Watershed.

**Lark Sparrow** (*Chondestes grammacus*) is a widespread local breeder on the Watershed. It is a Federal Species of Concern. It commonly inhabits grasslands bordering oak savannah and oak woodland.

**Olive-sided Flycatcher** (*Contopus cooperi*) is a Federal Species of Concern. It was found along two trails censused in 2001. The bird nests in trees, preferring conifers. They hunt using high perches as lookouts.

**Pacific-slope Flycatcher** (*Empidonax difficulities*) is a Federal Species of Concern. It is a common and widespread breeder on the Watershed. It inhabits moist, dense forest areas.

**Loggerhead Shrike** (*Lanius ludovicianus*) is a California Species of Special Concern. This species inhabits open areas such as pastures, open fields, and widely-spaced oak woodlands. The Breeding Atlas shows confirmed nesting sites on the Watershed.

**Warbling Vireo** (*Vireo gilvus*) is a Federal Species of Concern. It was found along all trails censused by PRBO in 2001. The Breeding Atlas shows it nesting throughout much of the Watershed. It nests in broadleafed evergreen forests.

**Yellow Warbler** (*Dendroica petechia*) is a California Species of Special Concern. The warbler feeds on spiders and insects as well as a few berries. It nests in a deciduous sapling or shrub in the riparian zone. The yellow warbler, once a widespread summer resident in riparian habitats over much of the State, has suffered a significant population decline in the past 50 years due primarily to habitat destruction and brood parasites. The 2001 PRBO census identified one occurrence of this bird

**Bell's Sage Sparrow** (*Amphispiza belli belli*) is a California Species of Special Concern. The Breeding Atlas shows the only known nest sites in the County are on the Watershed, The species occupies homogenous stands of chaparral dominated by chamise.

**Grasshopper Sparrow** (*Ammodramus savannarum*) is a widespread species in North America with a distinct preference for breeding in grasslands, but often occurs in low densities and in disjunct fragmented populations. The bird has been sighted on the Watershed.

**California Horned Lark** (*Eremophila alpestris actia*) is a California Species of Special Concern. The bird resides and nests in grassland. The Breeding Atlas shows several probable nest sites on the Watershed.

**Purple Martin** (*Progne subis*) is a California Species of Special Concern. The bird feeds on insects and usually nests in colonies. It nests in large trees with cavities near open foraging areas. The Breeding Atlas shows nesting sites on the Watershed.

## **Mammals**

**American Badger** (*Taxidea taxus*) is a California Species of Special Concern. In California, badgers ranged throughout the state except for the humid coastal forests of northwestern California in Del Norte County and the northwestern portion of Humboldt County. Badgers have been reported in the general area, and it is possible they inhabit the Watershed.

Badgers are carnivorous. They eat fossorial (i.e., burrowing) rodents such as rats, mice, chipmunks, and especially ground squirrels and pocket gophers. They also eat some reptiles, insects, earthworms, eggs, birds, and carrion. Diet shifts seasonally and yearly in response to availability of prey. Badgers dig burrows in friable soil for cover. They frequently reuse old burrows, although some may dig a new den each night, especially in summer. Young are born in burrows dug in relatively dry, often sandy, soil, usually in areas with sparse overstory cover. Suitable habitat for badgers is characterized by herbaceous, shrub, and open stages of most habitats with dry, friable soils.

They are active yearlong. And are both nocturnal and diurnal. They are non-migratory. The area used during winter is smaller than at other seasons. Home range estimates vary geographically and seasonally. In Utah, fall and winter home ranges of 5 females varied from 38-751 acres. Those of 2 males varied from 1,327-1,549 acres. In Idaho, home ranges of 7 adult females and 3 males averaged 400 acres and 600 acres, respectively. Badgers mate in summer and early fall. Gestation period varies from 183-265 days, including delayed implantation. Embryo implants about 45 days prior to birth. An average litter of 2-3 (range = 2-5) is born mostly in March and April (Long 1973).

**Pallid Bat** (*Anthrozous pallidus*) is a California Species of Special Concern and a U.S. Forest Service Sensitive Species. Pallid bat occupies grassland, shrubland, woodland, and forest habitats at low elevations in California. It can most commonly be found in open, dry habitats with suitable rocky areas for roosting. Day roosts include rock outcrops, mines, caves, hollow trees, buildings and bridges. Night roosts generally consist of more open areas such as porches and open buildings. This species feeds chiefly on a variety of arachnids and insects. The pallid bat is a yearlong resident throughout most of its range. During the non-breeding season, both sexes may be found roosting in groups of 20 or more individuals. Young are born from April to July. As with many bat species, pallid bat is extremely sensitive to roosting site disturbance. Recent research suggests a high reliance on tree roosts in portions of their range. The bat was

identified as roosting in several buildings on the Watershed (Garcia and Associates, 2004). Trees with potentially suitable cavities are present.

**Townsend's Western Big-eared Bat** (*Corynorhinus townsendii*) is a California Species of Special Concern and a Federal Species of Concern. Roosting sites include caves, mine tunnels, abandoned buildings and other structures. The bat forages in a variety of plant communities including coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands and deserts. It most commonly associates with mesic sites. The bat is highly sensitive to human disturbances. The bat roosts in several buildings on the Watershed (Garcia and Associates, 2004). Foraging habitat occurs in forest habitat and clearings.

**Red Bat** (*Lasiurus cinereus*) is a Proposed California Species of Concern and a U.S. Forest Service Sensitive Species. It roosts in foliage and is likely to roost on the Watershed (Garcia and Associates, 2004).

**Fringed Myotis** (*Myotis thysanodes*) is a Federal Species of Concern. It inhabits a wide range of habitat from low desert scrub to high elevation coniferous and deciduous/coniferous forests. It roosts in mines, caves, trees and buildings. It is likely that it roosts on the Watershed (Garcia and Associates, 2004).

**Yuma Myotis Bat** (*Myotis yumanesis*) is a Federal Species of Concern. It roosts colonially in caves, tunnels and buildings. It roosts in a wide variety of habitats at lower elevations. It forages over water where roosts are located within close proximity. It is likely that it roosts on the Watershed (Garcia and Associates, 2004).

**Long-eared Myotis Bat** (*Myotis evotis*) is widespread in California where it prefers coniferous woodlands and forests. It is a Federal Species of Concern and a Proposed California Species of Concern. It day roosts in hollow trees under exfoliating bark, and crevices in rock outcrops, sometimes in caves, mines and buildings. It is found throughout California. It is found roosting under bark of small black oak snags in northern California. This species generally roosts in small numbers or singly. Mating occurs in the fall and young are born the following May to June. It is likely that it roosts on the Watershed (Garcia and Associates, 2004).

**Long-legged Myotis** (*Myotis volans*) is a Federal Species of Concern. It day roosts in hollow trees, particularly large diameter snags or live trees with lightning scars. It also uses rock crevices, mines and buildings. Its habitat is usually defined by montane coniferous forests, pinyon-juniper, and Joshua tree woodland habitats. It is likely that it roosts on the Watershed (Garcia and Associates, 2004).

## Reptiles

**Western Pond Turtle** (*Clemmys marmorata*) is a Federal Species of Concern, a California Protected Species, and a California Species of Special Concern. Pond turtle habitat includes slow-moving or stagnant waters with pools at least one meter deep and one meter wide. MMWD authorized a survey and study of these turtles in 2003 (Garcia and Associates, 2003b) That survey found western pond turtle populations at Phoenix, Lagunitas, and Alpine Lakes, as shown on Figure 15. The population is isolated due to dams on Lagunitas Creek which prevent in-migration. The Watershed population is threatened by the introduction of non-native turtles.

The District has an ongoing program to trap these non-native turtles and give them away to approved organizations.



## Amphibians

**California Red-legged Frog** (*Rana aurora draytonii*) is Federally listed as Threatened and a California Species of Special Concern. California red-legged frogs prefer still or slow moving water in streams, ponds and springs and avoid ephemeral creeks and high gradient streams. Surveys of the Watershed have concluded that there are no populations of this frog remaining on the Watershed (Garcia and Associates, 2003). However, one of the streams that drains the Watershed does maintain populations of red-legged frogs and a second may. The frogs are known to inhabit the Big Lagoon area near where Redwood Creek enters the sea. The frogs may also inhabit lower sections of Lagunitas Creek near where it enters Tomales Bay. The following discussion of the frog is taken from the U.S. Fish and Wildlife Service's Final Rule for the *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-Legged Frog* (50 CFR Part 17, RIN 1018-AC 34, May 23, 1996). The critical habitat proposed for the frog includes a major portion of the Watershed, as shown on Figure 16.

The California red-legged frog (*Rana aurora draytonii*) is one of two subspecies of the red-legged frog (*Rana aurora*) found on the Pacific coast. The California red-legged frog is the largest native frog in the western United States, ranging from 4 to 13 centimeters (cm) (1.5 to 5.1 inches (in.)) in length.

The historical range of the California red-legged frog extended coastally from the vicinity of Point Reyes National Seashore, Marin County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico. The northern red-legged frog (*Rana aurora aurora*) ranges from Vancouver Island, British Columbia, Canada, south along the Pacific coast west of the Cascade ranges to northern California (northern Del Norte County). Red-legged frogs found in the intervening area (southern Del Norte to northern Marin County) exhibit intergrade characteristics of both *R. a. aurora* and *R. a. draytonii*. Systematic relationships between the two subspecies are not completely understood. However, significant morphological and behavioral differences between the two subspecies suggest that they may actually be two species in secondary contact. Northern Marin County represents the approximate dividing line between *R. a. draytonii* and the intergrade zone along the coastal range

California red-legged frogs breed from November through March with earlier breeding records occurring in southern localities. California red-legged frogs found in coastal drainages are rarely inactive, whereas those found in interior sites may hibernate.

The California red-legged frog occupies a fairly distinct habitat, combining both specific aquatic and riparian components. The adults require dense, shrubby or emergent riparian vegetation closely associated with deep (>0.7 meters (m)) still or slow moving water. The largest densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*). Well-vegetated terrestrial areas within the riparian corridor may provide important sheltering habitat during winter. California red-legged frogs estivate in small mammal burrows and moist leaf litter. They have been found up to 30 m (98 feet (ft)) from water in adjacent dense riparian vegetation for up to 77 days

California red-legged frogs disperse upstream and downstream of their breeding habitat to forage and seek estivation habitat. Estivation habitat is essential for the survival of California red-legged frogs within a watershed. Estivation habitat, and the ability to reach estivation habitat, can be limiting factors in California red-legged frog population numbers and survival.

Estivation habitat for the California red-legged frog is potentially all aquatic and riparian areas within the range of the species and includes any landscape features that provide cover and moisture during the dry season within 300 feet of a riparian area. This could include boulders or rocks and organic debris such as downed trees or logs; industrial debris; and agricultural features, such as drains, watering troughs, spring boxes, abandoned sheds, or hay-ricks. Incised stream channels with portions narrower than 18 inches and depths greater than 18 inches may also provide estivation habitat.

Egg masses that contain about 2,000 to 5,000 moderate-sized (2.0 to 2.8 mm (0.08 to 0.11 in.) in diameter), dark reddish brown eggs are typically attached to vertical emergent vegetation, such as bulrushes (*Scirpus* spp.) or cattails (*Typha* spp.). California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring. Eggs hatch in 6 to 14 days. In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity. One hundred percent mortality occurs in eggs exposed to salinity levels greater than 4.5 parts per thousand. Larvae die when exposed to salinities greater than 7.0 parts per thousand. Larvae undergo metamorphosis 3.5 to 7 months after hatching. Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis. Sexual maturity normally is reached at 3 to 4 years of age, and California red-legged frogs may live 8 to 10 years.

The diet of California red-legged frogs is highly variable. Larvae probably eat algae. Invertebrates are the most common food items of adult frogs. Vertebrates, such as Pacific tree frogs (*Hyla regilla*) and California mice (*Peromyscus californicus*), represented over half of the prey mass eaten by larger frogs. Juvenile frogs are active diurnally and nocturnally, whereas adult frogs are largely nocturnal. Feeding activity likely occurs along the shoreline and on the surface of the water.

The California red-legged frog has sustained a 70 percent reduction in its geographic range in California as a result of several factors acting singly or in combination. Habitat loss and alteration, overexploitation, and introduction of exotic predators were significant factors in the California red-legged frog's decline in the early to mid 1900s. It is estimated that California red-legged frogs were extirpated from the Central Valley floor before 1960. Remaining aggregations (assemblages of one or more individuals, not necessarily a viable population) of California red-legged frogs in the Sierran foothills became fragmented and were later eliminated by reservoir construction, continued expansion of exotic predators, grazing, and prolonged drought. Within the Central Valley hydrographic basin, only 14 drainages on the Coast Ranges slope of the San Joaquin Valley and one drainage in the Sierran foothills are actually known to support or may support California red-legged frogs, compared to over 60 historic locality records for this basin (a 77 percent reduction). The pattern of disappearance of California red-legged frogs in southern California is similar to that in the Central Valley, except that urbanization and associated roadway, large reservoir (introduction of exotic predators), and stream channelization projects were the primary factors causing population declines. In southern California, California red-legged frogs are known from only five locations south of the Tehachapi

Mountains, compared to over 80 historic locality records for this region (a reduction of 94 percent).

California red-legged frogs are known to occur in 243 streams or drainages in 22 counties, primarily in the central coastal region of California. The most secure aggregations of California red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack exotic predators (e.g., bullfrogs (*Rana catesbeiana*), bass (*Micropterus* spp.), and sunfish (*Lepomis* spp.)). Only three areas within the entire historic range of the California red-legged frog may currently support more than 350 adults, Pescadero Marsh Nature Preserve (San Mateo County), Point Reyes National Seashore (Marin County), and Rancho San Carlos (Monterey County). Threats, such as expansion of exotic predators, proposed residential development, and water storage projects, occur in the majority of drainages known to support California red-legged frogs.

The USFWS originally established critical habitat for the California red-legged frog on March 13, 2001. A lawsuit challenging the designation was filed in the Northern District Court of California on June 8, 2001. Most of the 2001 designation was vacated by the District Court on Nov. 6, 2002. The court cited deficiencies in both the final rule establishing the critical habitat designation, and the economic analysis done in anticipation of the rule. It ordered the Service to conduct a new economic analysis and publish a new critical habitat proposal by March 2004, and a final revised rule by November 2005. Figure 16 shows the new proposed critical area that includes the Watershed.

**Foothill Yellow-legged Frog** (*Rana boylei*) is a Federal Species of Concern, a California Species of Special Concern, and a California Protected Species. They have no legal status under current State or Federal endangered species regulations, and their protection is limited to a prohibition on taking the frogs themselves. The following description of the frog is taken from the California Department of Fish and Game's *Special Plants and Animals*.

*Rana boylei* is one of the most poorly known ranid frog species in California; no detailed study of its life history has ever been undertaken. This species is a stream-dwelling form that deposits masses of 300-1200 eggs on the downstream side of cobbles and boulders over which a relatively thin, gentle flow of water exists. The timing of oviposition typically follows the period of high flow discharge resulting from winter rainfall and snowmelt, which results in oviposition usually occurring between late March and early June. After oviposition, a minimum of roughly 15 weeks is needed to attain metamorphosis, which typically occurs between July and September. Upon metamorphosis, juveniles show a marked differential movement in an upstream direction very similar to the compensating mechanism displayed by stream insects that are subject to downstream drift. Two years are thought to be required to reach adult size, but no data are available on longevity. Postmetamorphs probably eat both aquatic and terrestrial insects, but few dietary data exist for this species.

*Rana boylei* requires shallow, flowing water, apparently preferring small to moderate-sized stream situations with at least some cobble-sized substrate. This type of habitat is probably best suited to oviposition and likely provides significant refuge habitat for larvae and postmetamorphs. Foothill yellow-legged frogs have been found in stream situations lacking a cobble or larger-sized substrate grain, but it is not clear whether such habitats are regularly utilized. Foothill yellow-legged frogs are infrequent or absent in habitats where introduced

aquatic predators (i.e., various fishes and bullfrogs) are present, probably because their aquatic developmental stages are susceptible to such predators.

MMWD has conducted stream surveys to identify the location of populations of these frogs (Garcia and Associates, 2003a and 2004). These studies determined that yellow-legged frogs are found along Big Carson Creek, two tributaries to Big Carson Creek, Little Carson Creek, and its tributary; see Figure 17.

## **Fish**

**Coho Salmon** (*Oncorhynchus kisutch*) is a Federally Threatened Species and a State Threatened Species. Coho salmon are anadromous fish which return each year to small streams along the Pacific Coast to spawn. They spend much of their adult lives at sea but always return to the location of their birthplace to lay their eggs. Coho salmon are known to spawn in and inhabit Lagunitas Creek on the Watershed as well as downstream of the Watershed. Coho also spawn in and inhabit Redwood Creek within Muir Woods National Monument, GGNRA, and private lands downstream of the Watershed. Historically, coho spawned and inhabited Corte Madera Creek and Arroyo Corte Madera del Presidio. While coho have not been seen in these two creeks since the 1980s, the two creeks have been listed as critical habitat for coho salmon.

The coho populations in both the Lagunitas Creek and Redwood Creek are considered very valuable as they are both wild populations (i.e., their genetic disposition has not been altered by hatchery releases to these streams). Lagunitas Creek is purported to support about 10% of the remaining wild coho population in California.

Lagunitas Creek was for decades a nationally famous coho salmon and steelhead fishery, approximately 5,000 coho strong, which supported both commercial and recreational use. In the latter half of the twentieth century, however the declining quality and availability of the watershed water, and above all, the loss of much of the available spawning habitat, led to a drastic decline in the numbers of returning salmonids. By the mid-1980s there were perhaps one hundred returning adults annually; some estimates put the number of coho salmon at fewer than fifty. This decline corresponds with statewide estimates of 515,000 coho in the 1940s to a current population of about 31,000 spawning fish.

### *Migration and Spawning*

In the Pacific Southwest, each year coho enter small streams and rivers on the California coast from the Monterey Bay area to the Smith River to begin their upstream migration from the ocean. They begin to enter freshwater in September but usually enter from October to March, peaking in December and January. In the 2003-2004 season, coho were sighted in Redwood Creek by the beginning of December with the peak numbers migrating in January.

The timing of the migration is dependent upon streamflow. Storm events result in streamflow changes which cue the coho to enter the creek. Immigration tends to come in "waves" or pulses, coinciding with storm events (Rich & Associates, 2000, p. 17). Traveling by daylight, coho reach their spawning destinations within a few days. Males typically arrive first and begin to mark out their territory. They are soon followed by females, who immediately begin looking for

a prime location to lay their eggs. They seek out gravelly riffles or pool tails with plenty of oxygen. Once an appropriate place is found, the female begins building her redd by turning over on her side and slapping the gravel with her tail. Attracted by this flapping, the alpha male in the immediate vicinity will begin circling the female until they both open their mouths, drop into the dug out redd, and release their eggs and milt respectively. Fertilization having just taken place, the female will then cover her redd back up with gravel and repeat the process up to four or five more times in different places laying up to a thousand eggs each time. Once the spawning process is completed, the coho salmon will guard their nests up to a week or so, and then they die.

### *Stream Life*

Buried within the stream bed, the eggs weather the winter storms and hatch some 30 to 60 days after being laid, depending on water temperature. Egg/alevin incubation generally occurs between January and early June with the peak period between the first of February to the first of May. These newly hatched fish remain in the gravel for a couple of weeks feeding on their own yolk sacks. Once the yolk sac is absorbed, the fry emerge from the gravel between January and June. In the creeks draining the Watershed, most fry emerge in March (Rich & Associates, 2000, p.18). These juvenile salmon will school together for a short time in shallow gravelly areas generally near shore before splitting up and dispersing themselves among the stream's many pools and shady undercut banks. Here they will dwell for over a year, feeding on insects, unhatched salmon eggs, and each other.

Once these fish have attained an appropriate size and the winter rains once more impede on the woods, the juveniles enter a new phase of life and undergo the process of smoltification. Smoltification consists of behavioral, morphological, and biochemical changes which transform a darkly pigmented, bottom dwelling freshwater salmonid (the parr) into a pelagic silvery fish (the smolt) (Rich & Associates, 2000, p. 18). During this process, coho emigrate from their natal streams into the sea. In Redwood Creek this smoltification occurs in the estuary at Big Lagoon where the creek enters the sea. Once the sand bar at the estuary is broken by the winter rains, the smolts enter the sea.

### *In the Ocean*

Once in the ocean, the salmon swim in schools. Although little is known conclusively about their movement and distribution, it is thought that they follow a northward summer migration along the coastal belt as far north as Alaska. Here they mingle with other species of salmon and have been known to associate with fish from as far away as Asia. While at sea they feed on smaller fish such as anchovies and herring and attain an average size of 25 inches. After about two years of ocean life, the fish are ready to spawn, and return once again to their native streams.

### *Critical Life Stage Requirements*

The following requirements were mainly taken from a report prepared on Corte Madera Creek (*Fishery Resource Conditions of the Corte Madera Creek Watershed, Marin County, California*, A.A. Rich & Associates, November 2000) and a recent report prepared by Rebecca Fitzgerald for the North Coast RWQCB (*Salmonid Freshwater Habitat Targets for Sediment-Related Parameters*, November 2004).

- Water temperature is the most important requisite as it affects the rate of development, metabolism, and growth. The fish's metabolism is directly proportional to water temperature (within certain limits). Thus, as water temperatures increase, so does the metabolic rate of the fish and the need for food. If there is enough food available and dissolved oxygen and other conditions are satisfactory, then the fish will grow. Optimal temperatures for spawning, incubation, and fry emergence are 12-18° Celsius while 15-18° Celsius are optimal for rearing and adult stages.
- Dissolved oxygen (DO) is needed for metabolism. Low DO can result in stress which can result in cessation of immigration, reduced growth rate, negative impact on swimming, etc. Dissolved oxygen should be above 7 mg/l, although 5 mg/l is acceptable at low water temperatures.
- Coho require and seek out clean (silt-free) gravel for spawning. Although, they will spawn and rear in embedded substrate if nothing else is available, there may be a subsequent reduction in survival to emergence. The North Coast RWQCB report sets a target of less than 25% of gravels and cobbles in the streambed being embedded.
- Fine sediments (generally defined as particles with a diameter less than 3 mm) may reduce intergravel flow and the delivery of dissolved oxygen to incubating eggs and developing alevins in the redd, impede or obstruct the emergence of alevins, reduce the carrying capacity of rearing habitats for juvenile salmonids, and/or smother food organisms. The North Coast RWQCB report sets substrate composition targets of less than 14% fines under 0.85 millimeters in diameter and less than 30% fines under 6.4 millimeters in diameter.
- Chronic turbidity that is caused by fine sediment suspended in the water column may interfere with feeding by juvenile salmonids and thereby reduce growth. Other potential effects of turbidity include irritation of gill tissues, avoidance behavior, and mortality. Although it is generally accepted that increased input of fine sediments can be harmful to salmonids, the exact threshold that may limit production of salmonid populations remains unknown. The North Coast RWQCB report does not set a quantitative turbidity target. Generally, turbidity should be 27 NTU (Nephelometric Turbidity Unit) or less. The North Coast RWQCB report describes how the length of time fish are exposed to certain levels of turbidity is as important as the degree of turbidity. The longer the exposure, the more harmful to fish survival.
- Pollutants washed off urban areas (oil, detergents, lawn and garden sprays containing herbicides and pesticides) are all toxic to coho and other fish. These pollutants can result in chronic stress or may be lethal, depending on the material, the concentrations, and other factors. Coho are opportunistic predators that eat a wide variety of aquatic invertebrates and terrestrial invertebrates that fall into the stream.
- Abundant food is particularly important during the warm summer months when water temperatures and metabolism are higher.

- The amount of streamflow affects all life stages of the coho. The amount of flow is critical to immigration from the sea. Once in the creeks, there must be sufficient flow to pass over any barriers in order to reach spawning areas. Streamflow regulates the amount of spawning area available; as flows increase (up to a point), more gravel is covered with water and becomes suitable for spawning. During egg incubation and fry emergence, adequate streamflows are necessary to cover the eggs and wash away excretory products. During rearing, streamflow is related to the amount of food and physical habitat available. Streamflow is also important in smoltification and emigration to the sea. Preferred water velocity during spawning is  $\leq 4$  cfs, incubation –  $\leq 1.6$ -3 cfs, fry emergence –  $\leq 0.26$ -1 cfs, rearing -  $\leq 0.26$ -1 cfs, and adult – 0.4-2.4 cfs.
- Coho require and seek out clean (silt free) gravel. Although they will spawn and rear in embedded substrate, if nothing else is available, there is usually a resulting reduction in survival. Successful spawning, incubation, and fry emergence depend upon 1) the appropriate size class composition of the substrate; 2) the existing degree of embeddedness; 3) the porosity of the substrate down to below the point of egg deposition in the fish's redd; and 4) the percolation rate of water through the substrate. Preferred substrate size for spawning is 1.5-6.0 cm (0.6-2.4 inches) for fish under 50 cm in length or 1.5-10.0 cm (0.6-4.0 inches) for fish over 50 cm in length. For incubation and fry emergence ideal sizes are 0.3-10 cm (0.1-4 inches). During rearing, ideal size is 1.5-10 cm (0.6-4 inches).
- Water depth is important to coho and other salmonids, particularly during immigration and spawning. They will rarely seek redds which would later be exposed by receding water levels. During egg development, there must be an abundance of well-oxygenated water flowing over the redds. Preferred depths are greater than 18 cm (7 inches).
- Cover (overhanging vegetation, undercut banks, submerged rocks and vegetation, submerged objects like logs, floating debris, and turbulence and depth) provides protection from predators and can reduce water temperatures. Young salmonids prefer habitats characterized by abundant cover.

**Steelhead Trout** (*Oncorhynchus mykiss*) is a Federally Threatened Species. Steelhead trout can either be migratory (i.e., emigrating to the ocean for several years and returning to their natal stream for spawning), resident (i.e., rainbow trout not emigrating to the ocean), or mixed populations. Both the anadromous and resident forms may exist in the same stream, and, in some instances, may be physically discrete from one another, due to an impassable barrier such as a waterfall. Except for the size and ocean-going habits, the steelhead trout is virtually indistinguishable from the resident form. The ecological relationships and life stage requirements are essentially the same as described above for coho salmon. The one difference is that not all steelhead die after spawning. They can return to the sea and return for subsequent spawning events. Steelhead trout populations inhabit Lagunitas Creek, Redwood Creek, Corte Madera Creek, and Arroyo Corte Madera del Presidio and several of their tributaries.

## **Invertebrates**

**California Freshwater Shrimp** is a Federal and California Endangered Species. The following description of the characteristics and requirements for this species was taken from Appendix B of the *Lagunitas Creek Sediment and Riparian Management Plan Draft Biological Assessment* (MMWD, 1997), Serpa (1996), USFWS (1998), and California Department of Fish and Game (2001). The California freshwater shrimp is the State's only native, stream-dwelling shrimp. This species resembles its marine relatives but rarely attains a carapace length (measured from the eye socket to tip of the tail) of more than two inches. The California freshwater shrimp feeds on decomposing plants and other detrital material. When disturbed, they can change their color, from translucent to entirely dark brown or purple, to blend in with their surroundings. Females can darken their bodies to a greater degree and are also generally larger and deeper bodied than males. Adults reach sexually maturity by the end of their second summer of growth. Thereafter, they breed once a year in the fall. Females produce about 50 to 120 eggs, which remain attached to their mother throughout the winter.

Although the shrimp breed in September, the females retain the 50-120 fertilized eggs on their abdominal swimming legs throughout the winter. This adaptation insures that the juveniles do not have to face the heavy streamflows of the rainy season. Instead, the females protect the delicate eggs with their own bodies during this perilous period. The young shrimp are finally released as miniature adults in late Spring, after the rainy season is almost over, and the streams are carrying much less water. In this more hospitable environment, the young grow rapidly. California's prolonged summer drought cuts the stream flow even more, and some shrimp streams are reduced to isolated pools in late summer and fall. As temperatures rise and oxygen diminishes, trapped fish begin to die. This is still good habitat for the shrimp, though, and the dead fish are simply treated as food. As long as some water remains in the pools, the shrimp can survive. The following winter these young shrimp will have to get through a rainy season on their own. They must be about a year and a half old before they in turn are mature enough to breed.

The California freshwater shrimp is found in pool areas of low-elevation, low-gradient streams, among exposed live tree roots (e.g., willows and alders) of undercut banks, overhanging woody debris, or overhanging vegetation. These streams have low summer flows but may transport heavy runoff during the rainy season. The historic distribution of the California freshwater shrimp is unknown, as geologic and climatic changes since the early Quaternary Period have greatly altered drainage and river courses along the central coast of California. However, currently the California freshwater shrimp is found in 17 stream segments within Marin, Napa and Sonoma counties. Many of these stream segments are isolated from the others by barriers, dewatered areas and low quality habitat. In the general area around the Watershed, freshwater shrimp are known only from within the main stem of Lagunitas Creek downstream of Shafter Bridge. No shrimp have ever been found between Peters Dam and Shafter Bridge. The best habitat and greatest abundance of shrimp is found between the downstream State Park boundary and the confluence with Nicasio Creek.

The shrimp were listed by the U.S. Fish and Wildlife Service as Endangered in 1988. Since that time, shrimp have been found surviving in eleven separate stream systems (seventeen streams), but the future of the species is still uncertain. Thousands of shrimp live in Lagunitas, Salmon, and Blucher Creeks, but even in these streams, a single toxic spill could wipe out the bulk of the population. USFWS completed its Recovery Plan for the California Freshwater Shrimp in August 1998. This plan includes the following recommended recovery actions: 1)



remove existing threats to known populations of California freshwater shrimp; 2) restore habitat conditions favorable to California freshwater shrimp and associated native aquatic species; 3) protect and manage California freshwater shrimp populations and habitat once the threats are removed and restoration has been completed; 4) monitor and evaluate California freshwater shrimp habitat conditions and populations; 5) assess effectiveness of various conservation efforts; 6) conduct research on the biology of the species; 7) restore and maintain viable California freshwater shrimp populations at extirpated locations; 8) increase public awareness and involvement in the protection of California freshwater shrimp and native cohabiting species; 9) assess effects of various conservation efforts on cohabiting native species; and 10) assemble a California freshwater shrimp recovery team.

The shrimp are found within stream pools, in areas away from the main current, where there are often undercut banks, exposed root systems, and vegetation hanging into the water. They need all of these habitat components for survival. The best habitats have a mixture of willow and alder trees. Some of the shrimp streams are completely enclosed with streamside vegetation, while others have just a few scattered trees along the banks. In the latter case, dark, shaded water is necessary to help protect them from visual predators. Too little or too much water in the stream can present a problem. Most shrimp are found in areas that are one to three feet deep. For the most part, only the sides of the pools are utilized. Shrimp avoid the pool bottoms, and are only found there after being disturbed, or when populations are especially high.

Filamentous blackberry roots sprout from stems wherever they extend beneath the surface, and form an ideal refuge most of the year. At times of higher flow, though, these roots tend to be lifted out of the stream by the rising water, and left in a useless tangle above the bank when the water recedes. Dense, beard-like willow roots, often extending more than a foot out into the water, are more dependable. Alders provide both short filamentous roots, and the coarser hard roots that support the stream banks. As the bank soils partially erode from the force of the current, a network of the rigid roots is exposed. Overhanging the undercut banks, these roots reduce the erosive power of the water, and protect the banks from further damage. The roots form a useful highway system for the shrimp. During the heavy flows of water accompanying storms, the shrimp abandon the softer vegetation and travel close to these sturdy roots, or even move within the undercut banks for protection.

California freshwater shrimp are detritus feeders, feeding on the buffet of small, diverse particles brought downstream to their pools by the current. As the water slows, the particles are filtered out by the exposed roots and other vegetation. The shrimp simply brush up the food with tufts at the ends of their small claws, and lift the collected morsels to their mouths. Much of this material is picked up indiscriminately, and contains indigestible material along with the more edible items. To get enough useful food, the shrimp have to eat a lot of this detritus. Larger pieces of detritus are picked up or manipulated with the claws. Colonized by algae, bacteria, fungi, and microscopic animals, the particles are more nutritious than they seem. Although shrimp usually walk slowly about the roots as they feed, these crustaceans will undertake short swims to obtain particularly tasty items.

## **B. Potential Impacts and Mitigation Measures**

## CRITERIA USED FOR DETERMINING SIGNIFICANCE

For purposes of this report, the proposed project is considered to have a significant impact on biological resources if any of the following criteria are met:

- 3.3a Has a substantial adverse effect, either directly or through habitat modification on any species identified as a candidate, sensitive, or Special Status Species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service. This includes reducing the number or restricting the range of an endangered, rare, or threatened species. *(Assessed in Impact 3.3-A through 3.3-D.)*
- 3.3b Interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites. *(Assessed in Impact 3.3-E.)*
- 3.3c Conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan. *(There is no adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan covering the Watershed, and thus there would be no impact vis-à-vis this criterion.)*
- 3.3d Has the potential to substantially reduce the number or restrict the range of an endangered, rare, or threatened species *(Assessed in Impacts 3.3-B through 3.3-F.)*

## PROJECT IMPACTS

**Impact 3.3-A            Implementation of Draft Plan projects will reduce sedimentation and turbidity in streams draining the Watershed thereby benefiting aquatic wildlife species.**

In 20 years, upon completing construction of the projects in the Draft Plan, an estimated 185,542 cubic yards of sediment that would otherwise have entered Watershed streams would remain on the Watershed. The reduction in stream sedimentation would have a long-term **beneficial** impact on listed species of salmonids, California freshwater shrimp, yellow-legged frogs and red-legged frogs. A primary objective of the Draft Plan is to reduce land use impacts to salmonids and other aquatic species.

**Impact 3.3-B            Construction of specific projects could result in short term erosion thereby adversely affecting turbidity and adding sediment to streams draining the Watershed. This increased turbidity and sediments could adversely affect Special Status Species of salmonids, frogs, and shrimp.**

As discussed previously under Impacts 3.1-B to 3.1-F, constructing various classes of projects could result in short-term erosion. Eroded sediments from projects which could be deposited in Corte Madera Creek, Arroyo Corte Madera del Presidio Creek, Redwood Creek, and/or Lagunitas Creek below Peters Dam could adversely affect coho salmon, steelhead, California freshwater shrimp, red-legged frogs, yellow-legged frogs, and western pond turtle. The range of possible impacts are discussed below.

#### *Coho Salmon and Steelhead*

As previously described, coho salmon and steelhead require and seek out clean (silt-free) gravel for spawning. Although, they will spawn and rear in embedded substrate if nothing else is available, there may be a subsequent reduction in survival to emergence. Fine sediments (generally defined as particles with a diameter less than 3 mm) may reduce intergravel flow and the delivery of dissolved oxygen to incubating eggs and developing alevins in the redd, impede or obstruct the emergence of alevins, reduce the carrying capacity of rearing habitats for juvenile salmonids, and/or smother food organisms.

Chronic turbidity that is caused by fine sediment suspended in the water column may interfere with feeding by juvenile salmonids and thereby reduce growth. Other potential effects of turbidity include irritation of gill tissues, avoidance behavior, and mortality. Although it is generally accepted that increased input of fine sediments can be harmful to salmonids, the exact threshold that may limit production of salmonid populations remains unknown. Generally, turbidity should be 25 mg/l or less.

Construction of projects, particularly removing stream crossings fills and repairing landslides, could result in erosion and deposition of sediment into streams. This sediment could be carried downstream, increasing turbidity and adversely affecting spawning. Many (about 670) of the projects included in the Draft Plan are in watersheds that drain to Watershed reservoirs; these projects would not affect steelhead and coho salmon. About 36 projects and 1,200 feet of road decommissioning are in the Watershed that drains to Lagunitas Creek below Peters Dam. This is the only area on or near the Watershed where there are spawning coho salmon near the location of the proposed erosion control projects. About 93 projects will be done within the Redwood Creek watershed which supports coho downstream of the watershed, 94 projects in the Corte Madera Creek watershed, and 93 projects in the Arroyo Corte Madera del Presidio. The latter two creeks are designated as critical habitat for coho but do not currently support coho populations.

#### *California Freshwater Shrimp*

Sedimentation caused by erosion causes quantities of sand and fine gravel to fill pools and glide areas of the stream and to fill the spaces around cobbles, boulders, and undercut banks. When large amounts of fine material are deposited in these areas, water circulation, oxygen, nutrients, and the removal of waste products are reduced. Fines also reduce the spaces within the undercut banks that shrimp use as refugial habitat. The fine sediments fill in pools and decrease summer resting and rearing areas used by the shrimp. As the numbers of pools and pool volumes decrease, shrimp become more susceptible to predation by various species of fish. The Draft Plan includes about 27 erosion control projects and decommissioning of about 1,200 feet of roads in sub-watersheds that would drain to Lagunitas Creek below Peters Dam

Erosion would not directly affect other factors that affect shrimp populations. These factors (riparian vegetation, instream woody debris, and streamflow volume) would not be affected by projects occurring under the Draft Plan. The shrimp population is not on the Watershed, so projects occurring under the Draft Plan would not occur adjacent to that part of Lagunitas Creek that supports the shrimp. The District is currently implementing projects under its *Lagunitas Creek Sediment and Riparian Management Plan* which do address these other concerns. These projects are beneficial to the shrimp population, as would be the projects included in the Draft Plan over the long term. However, short-term construction-generated impacts from erosion caused by construction of up to 27 projects and road decommissions in the Lagunitas Creek (below Peters Dam) watershed could adversely affect streambed conditions that support the shrimp.

### *Red-legged Frogs*

The frogs do not inhabit the Watershed. As such, construction of projects would not have a direct impact on this species, that is, there would be no injury to the frogs from work within a stream. The only known location where red-legged frogs exist on streams draining the Watershed is new Big Lagoon at the downstream end of Redwood Creek, though they may exist in the lower reaches of Lagunitas Creek. Any construction-generated erosion from Draft Plan projects at the head of either these creeks would be minimal in their lower reaches near the ocean. In addition, red-legged frogs do not appear to be significantly affected by turbidity and at least minor sedimentation (Fidenci, personal communication, 10/20/04).

### *Yellow-legged Frogs*

These frogs escape predators by diving to the bottom of streams and hiding beneath rocks, in debris, or in silt on the stream bottom. Yellow-legged frogs would be adversely affected by sediment that reduced the number and volume of ponds since shallower ponds would reduce refugial habitat. Increased turbidity would also likely adversely affect the frogs.

The only populations of these frogs on the Watershed are on Big Carson Creek, Little Carson Creek, and three tributaries to those creeks. The Draft Plan includes several projects in areas where yellow-legged frogs were identified in 2004 surveys. Frog egg masses and tadpoles were found where these creeks travel beneath Kent Pump Road and immediately upstream and downstream of those stream crossings. Removal of these crossings to replace culverts, as recommended in the Draft Plan, could result in direct mortality of these frogs, their eggs, or tadpoles.

Frogs were found on Little Carson Creek all the way to the base of Carson Falls. The Little Carson Trail traverses very near this creek and includes several creek crossings. Social trails off the main trail also access the creek. Pierre Fidenci of Garcia & Associates reported that the frogs breed at the base of the falls. He found crushed egg masses where people and/or dogs had entered the creek at this sensitive location (Fidenci, personal communication). A survey of Little Carson Creek below the falls indicates that the falls themselves appear to be relatively heavily used (given the trails between the Little Carson Falls Trail and the creek). Downstream of the pool at the base of the falls, it does not appear that people frequently enter the creek.

The trail is often near the creek, but the creek and the trail have a steep gradient, and, in most locations, the creek is not easily accessible.

Improvements should be made to the trail between the head of the falls and below the falls to reduce existing user impacts to the yellow-legged frog population in this stream.

The Draft Plan only calls for a few minor improvement projects on the Little Carson Trail. The main improvements are at the Kent Pump Road crossings. On Big Carson Creek, the Draft Plan calls for culvert removal on Pine Mountain Road and stream crossing removals on a non-system trail adjacent to that creek. In addition to the impact discussed above, construction of these projects could cause erosion and sedimentation which could adversely affect the populations of these frogs.

#### *Western Pond Turtle*

This turtle is found only at three reservoirs on the Watershed. Localized sedimentation and turbidity from projects included in the Draft Plan would not be expected to affect these populations.

#### *Summary*

The increased sedimentation could adversely affect streambed characteristics by adversely affecting spawning and rearing habitat for salmonids, shrimp, and possibly frogs. Turbidity caused by eroded sediments could adversely affect these same species. While these impacts would be expected to be short-term and limited in scope, any impact that could reduce the viability of these listed fish, frog, and shrimp populations would be considered a ***potentially significant impact***.

#### ***Mitigation Measures***

All the mitigation measures recommended for Impacts 3.1-B to 3.1-D apply to this impact. Lagunitas Creek is an area of particular concern to MMWD, and the District will continue to carry out actions to improve salmonid habitat in that creek. In addition, the following measures are required:

- 3.3-B.1 All work at stream crossings of Little Carson Creek, Big Carson Creek, and their tributaries shall be conducted between September 1 and October 15. Prior to the start of work, a wildlife biologist who is qualified to identify and handle yellow-legged frogs shall survey the area to be affected by the stream crossing project. The biologist shall remove any frogs or tadpoles at risk and release them in a safe location on the creek. The biologist should be present prior to each day's work to relocate frogs and tadpoles.
  
- 3.3-B.2 MMWD shall install signs that clearly explain that Little Carson Creek from the base of the falls to Kent Lake is one of two drainages in the Watershed currently supporting yellow-legged frogs and what the status of those frogs is. The sign shall explain that dogs or humans entering the stream can crush egg masses, tadpoles, and frogs and that it is imperative that people keep their dogs on leash and that

neither they nor their dogs enter the stream channel from the base of the falls to Kent Lake. A second sign shall be placed on the non-system trail that leads from Little Carson Trail to the pool at the base of the falls that explains the trail is closed and the reasons for that closure. This branch trail should be blocked. MMWD shall determine the route of the trail from the head of the falls to the base consistent with its goals to protect yellow-legged frogs while reducing sedimentation.

### ***Impact Significance After Mitigation***

The extensive BMPs and mitigation measures included under Impacts 3.1-B to 3.1-D would reduce the amount of sediment transported to streams during project construction to a less than significant level. The small amount of sediment that would enter streams draining the Watershed after implementing the BMPs and mitigation measures included in the Draft Plan and this EIR would not be expected to adversely affect any listed aquatic species. The short-term construction-related impacts would be reduced to a ***less than significant level***. As previously noted, the long-term impacts would be beneficial to all these species.

The recommended mitigation measures for the road crossing of Little Carson and Big Carson Creek would reduce the potential impacts of those projects on the yellow-legged frog populations.

The mitigations recommended for Little Carson Falls addresses an existing management problem, and not one caused by the Draft Plan. The mitigations should substantially reduce the use of the pool at the base of the falls and the stream below that point. While it might be preferable to entirely close access to the falls, such a closure would likely not be successful given the popularity of the falls. By allowing controlled access to the less sensitive part of the falls and providing a detailed signing/education program, the impacts to the yellow-legged frog population should be reduced.

### **Impact 3.3-C                      Construction of projects could destroy the nests of Special Status Species of birds or disrupt nesting birds.**

Constructing some of the projects could require removing trees, shrubs, and other vegetation that may support nesting Special Status Species of birds. This could result in a direct loss of those nests. The use of heavy equipment or even hand-held power tools in areas near nests could result in noise and disturbance. Some of these Special Status Species of birds are sensitive to human presence and loud noises. Therefore, construction of individual projects could result in some of these birds abandoning their nests. This would be a ***potentially significant impact***. It is not possible to be more definitive about precisely what birds might be affected by what project(s) since Watershed-wide surveys of the nest sites of Special Status Species of birds have not been conducted. In addition, many of these birds may change their nest every breeding season, so surveys would be of little use. MMWD does know where the nests of spotted owls and ospreys are located, and work near these nests would be avoided during the nesting season.

### ***Mitigation Measures***

- 3.3-C.1 If shrubs or trees would need to be removed to construct a specific project, MMWD should remove those trees and shrubs prior to the onset of the nesting season (i.e., after late July and before mid-March of any year) so birds will not nest in trees or shrubs on the construction site. However, trees known to be used for northern spotted owl and golden eagle nesting shall not be removed.
- 3.3-C.2 For projects that would remove trees or shrubs (that were not removed per Mitigation Measure 3.3-C.1) and projects that would use heavy equipment in forested areas or areas of chaparral during the primary bird breeding season (mid-March through the end of July), a qualified wildlife biologist shall examine the project site and surrounding area to determine the presence of nests of any Special Status Species of birds. If said nests are found in trees or shrubs planned for removal and/or if the wildlife biologist determines that the proximity of nearby nests to the site where heavy equipment would be operating would or could result in the adult birds abandoning the nest, work at the site will be scheduled to occur after the breeding season.
- 3.3-C.3 For projects within spotted owl nest areas, heavy equipment will not be operated between February 1 and August 31 within one quarter mile of any spotted owl nest site unless protocol surveys determine the nest is not being used.

### ***Impact Significance After Mitigation***

The mitigation measures should protect the nests of Special Status Species of birds and ensure that project construction does not cause these birds to abandon their nests and their young. These mitigation measures would reduce the impact to a ***less than significant level***.

### **Impact 3.3-D Construction of projects could kill or injure Special Status Species of terrestrial wildlife or substantially diminish or harm habitat essential for the survival of these species.**

The projects in the Draft Plan would result in more natural habitat (approximately 6.5 acres) available to wildlife than is currently the case. In addition, decommissioning the target roads and trails would provide additional habitat which is not located near an area where humans and dogs are present. The long-term impact to wildlife habitat is considered ***beneficial***.

Constructing some of the projects would require removing trees, shrubs, and other vegetation (as described under the impact discussions in Section 3.2) that may support reproductive sites of badgers (dens) or the various bats that may roost in trees on the Watershed (red bat, fringed myotis, Yuma myotis, long-eared myotis, and long-legged myotis). This could result in a direct loss of young animals. The use of heavy equipment or even power tools in areas near these sites could result in noise and disturbance resulting in some animals abandoning their young, though the bats are less likely to abandon their roosts unless the roost tree itself is actually disturbed. The discussion of this impact must remain general since surveys to determine the presence, range, and reproductive locations of badgers and the bats have not been done.

Destroying active reproductive sites of Special Status Species of terrestrial animals would be a ***potentially significant impact.***



### **Mitigation Measure**

- 3.3-D.1 Prior to construction of any project, the site will be surveyed for the presence of badger dens or burrows. If such sites are identified, work shall not start at that site until a qualified wildlife biologist has determined that the den is not active or, if active, until the young have left the site and are capable of surviving away from the site.
- 3.3-D.2 Tree removal larger than 24 inches (dbh) shall occur during one of two time windows: a) after the bat maternity season, when young bats are volant (i.e., flying) (September 1), and before the hibernation period (October 30), or b) after hibernation (March 1), and before birth of young (April 15). Trees smaller than 24-inches dbh not immediately adjacent (within 15 feet) to large trees (>24-inches dbh) may be removed at any time.
- 3.3-D.3 Smaller trees (<24-inches dbh) that are adjacent to larger trees (>24-inches dbh) shall be removed first, one day (24 hours) before removal of adjacent large trees. This will provide an indirect disturbance that should be sufficient to cause bats roosting in adjacent larger trees to vacate the roost, without providing enough time for re-colonization of the roost.
- 3.3-D.4 Snags shall not be removed without first being surveyed by a qualified bat biologist, 2-4 weeks prior to planned tree removal to determine whether bats are roosting inside the trees. If no roosting is observed, the snag shall be removed within one week following surveys. If bat roosting activity is observed, limbs not containing cavities, as identified by the bat biologist, shall be removed first, and the remainder of the tree removed the following day. The disturbance caused by limb removal, followed by a one night interval, will allow bats to abandon the roost.

### **Impact Significance After Mitigation**

The recommended mitigation measures would protect bats during the critical maternity and hibernation seasons and allow bats roosting during other periods to escape injury. Badgers would also be protected. The mitigation measures would reduce impacts to bats that could roost on the site to a **less than significant level**.

### **Impact 3.3-E Construction of projects could interfere with wildlife travel routes and patterns.**

The only projects included in the Draft Plan that might interfere with wildlife travel routes or patterns would be construction of new trail reroutes. However, these trails do not pose a barrier to movement and would not be expected to substantially alter wildlife travel patterns. None of the other projects would interfere with such movements. Trail and road decommissioning would have a beneficial impact on animal travel. The impact would be **less than significant**, and possibly beneficial. No mitigation is required.

**Impact 3.3-F Construction of projects could kill or injure other species (i.e., not Special Status Species) of wildlife.**

Constructing the various projects requires removing vegetation and moving dirt around. These actions, especially the use of heavy equipment, can result in the death or injury of animals occupying the area. Most birds and larger animals will escape the area once humans are present, especially once they start making noise. However, smaller animals may take refuge in burrows or in trees and shrubs. These animals could be injured or killed. The impact would not be expected to cause a substantial decline in any wildlife population, and would not be significant given the significance criteria used for this EIR. Nevertheless, as Watershed stewards, MMWD should make every effort to minimize the loss of animal life.

The projects would not adversely affect habitat available to common wildlife species. While there would be some short-term loss of native habitat, this habitat would be expected to recover within a short time after the completion of construction. In addition, road and trail decommissioning will provide more wildlife habitat than currently exists. The removal of certain roads and trails would also provide additional area where human and dog presence would be absent or reduced, to the benefit of wildlife.

***Mitigation Measures***

3.3-F.1 During all on-site activities, MMWD and its contractors shall take all precautions to avoid damaging or killing any form of wildlife, including snakes, lizards, small mammals, or birds, that becomes exposed during vegetation or soil removal. If such an animal is observed in the work area, the contractor shall move the animal out of harm's way, if possible, or request MMWD personnel to move the animal.

***Impact Significance After Mitigation***

The mitigation measure would reduce the chances of workers killing or injuring animals. The impact would be ***less than significant***.

**Impact 3.3-G Adoption of non-system trails as part of the official trail system could result in increased use of those trails to the detriment of nearby wildlife populations.**

The proposed inclusion of eleven non-system trails as part of the trail system could result in increased use of those trails as they become increasingly shown on published trail maps and in trail guides. Birds and other animals which are sensitive to human presence would tend to avoid nesting, breeding, and foraging in habitat near these trails. However, human use of all eleven of these trails is already reasonably heavy; the existing use and popularity of these trails as connector trails is one of the very reasons they are proposed for adoption. It is expected that wildlife residing in the area of these trails is already inured to the presence of people and their dogs and horses. While publicization of these trails could lead to some increased usage, that increase would not be expected to cause a significant decline in the habitat available to wildlife sensitive to human presence. In addition, the expected minor impact is offset by the additional

wildlife habitat opened up by the Draft Plan's proposed trail and road decommissions. The impact is ***less than significant***, and no mitigation is required.

## 3.4 OTHER RESOURCES

### A. Summary of Less than Significant Impacts

The Initial Study (included in Appendix A of this EIR) determined that the projects included in the Draft Plan would not have significant impacts on aesthetics, agricultural resources, hazards and hazardous materials, land use and planning, mineral resources, population and housing, public services, recreation, and transportation and traffic. It was concluded that the Draft Plan could have significant impacts on air quality, cultural resources, geology and soils, and noise.

The appended Initial Study provides a detailed discussion of why the Draft Plan would have no impact or a less than significant impact on most resources. The following briefly summarizes that appended discussion.

**Aesthetics.** Draft Plan projects will generally be visible only by Watershed users passing by the construction site. The projects will not affect views from off the watershed. The visual effects of constructing the various projects will be short-term as the disturbed areas will either be purposely restored or will naturally recover.

**Agricultural Resources.** The site is a public watershed and does not include agricultural uses.

**Air Quality.** The project will not generate substantial amounts of traffic nor emit substantial amounts of pollutants into the air. The only possibly significant air quality impact would be dust emissions during project construction. A mitigation measure (listed below) was developed to reduce this impact to a less than significant level.

**Cultural Resources.** It is possible that project construction could damage or destroy currently undiscovered archaeological resources. A mitigation measure (listed below) was developed to reduce this impact to a less than significant level.

**Geology and Soils.** Project improvements would not be expected to fail during seismic events and cause injuries to people or buildings. Some projects could aggravate or cause landsliding. A mitigation measure (listed below) was developed to reduce this impact to a less than significant level. Many of the projects could cause soil erosion. Previous sections of Chapter 3 of this EIR have addressed those potential erosion impacts.

**Hazards and Hazardous Materials.** The only hazardous material used for the project would be vehicle fuels, and it is not expected that such use would pose a risk to the environment. Improving the Watershed road system will facilitate emergency access, which is a beneficial impact.

**Hydrology and Water Quality.** The projects would not affect groundwater resources. Other than erosion impacts, which are assessed in other sections of this EIR, project construction would not be expected to affect water quality. The projects would not increase downstream flooding. Erosion and sedimentation impacts on streamflow are assessed in Section 3.1 of this EIR.

**Land Use and Planning.** The projects would not divide any existing community, and the Draft Plan is consistent with the County General Plan.

**Mineral Resources.** The projects would not result in the loss of any known mineral resource or mineral resource recovery site.

**Noise.** The only potential noise impact would be short-term construction noise impacts for those few projects within one-quarter mile of an existing residence. A mitigation measure (listed below) was developed to reduce this impact to a less than significant level.

**Population and Housing.** The Draft Plan will neither increase the area population, add new housing, nor demolish existing housing.

**Public Services.** The Draft Plan includes construction of erosion-control projects and decommissioning certain roads and trails. It will not increase the demand for police, fire, school, or park services.

**Recreation.** The Draft Plan would result in a small decrease in the number of roads and trails available for recreational use. The decrease is considered less than significant given the 200+ miles of roads and trails open to Watershed users. The closure of these trails and roads could result in some increased usage of other roads and trails. However, this increased usage is expected to be low given the relatively light use the targeted roads and trails receive. The increased use of the other roads and trails is not expected to cause any increased impacts to resources along those roads and trails.

**Transportation and Traffic.** Constructing projects will generate trips to haul equipment and supplies and to move laborers. However, the number of trips generated is estimated to be very low (3-5 roundtrips per day on average) and would not be expected to significantly affect operations on public streets accessing the Watershed. Improving the road surfaces and installing rolling dips could encourage speeding which could cause accidents. This is not expected to be a significant safety hazard so long as rolling dips are properly constructed.

**Utilities and Service Systems.** The projects would not increase the demand on water, wastewater or solid waste systems, Impacts to drainage systems are assessed in Section 3.1 of this EIR.

**Energy Use.** Energy would be used to construct the projects. Over the long term, storm-proofing the road and trail system would reduce the amount of annual maintenance and repairs thereby reducing the use of energy.

Mitigation measures were developed as part of the Initial Study. These mitigation measures are presented below along with the significant impacts that they mitigate.

## **B. Air Quality**

Construction of projects included in the Draft Plan will require the use of heavy equipment (e.g. bulldozers, excavators, graders) to conduct grading and other earthwork. Construction emissions will include emissions from gas and diesel powered equipment and small particulates

(i.e., dust) generated during grading operations. The following will be done to mitigate the **potentially significant** air quality impacts:

3.4-A.1 MMWD will require its staff or contractors to implement, as appropriate, the BAAQMD's basic control measures for emissions of dust during construction, including:

- Water all dry active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and all loose materials, or require trucks to maintain at least two feet of freeboard.
- Apply water as needed to all unpaved access roads, parking areas, and staging areas.
- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, or water twice daily the exposed stockpile of excavated material.
- Limit traffic speeds on unpaved roads to 15 mph.
- Replant vegetation on fill slopes as soon as feasible.
- Suspend excavation and grading activities when winds (instantaneous gust) exceed 25 mph.

#### Impact Significance After Mitigation

Implementation of these standard dust control measures will reduce dust to levels that the Bay Area Air Quality Management District recognizes as being acceptable. Emissions from heavy equipment engines are not expected to be significant since the projects would occur intermittently, equipment would not operate for long periods, and equipment would not be operating for long in any one location. The impact would be reduced to a level that is **less than significant**.

### **C. Cultural Resources**

It is possible that projects included in the Draft Plan could damage or destroy archaeological and other cultural resources. To reduce this **potentially significant impact**, the following measures will be implemented:

3.4-B.1 The *Mount Tamalpais Area Vegetation Management Plan Draft EIR* (Leonard Charles and Associates, 1994) contains an Archaeological Sensitivity Map (Figure 21 of that Draft EIR) which identifies areas within the Watershed that may contain cultural resources. This map was prepared by a consulting archaeologist and is used by MMWD to check for archaeological resources prior to conducting Vegetation

Management Plan projects. This same map will be used to guide future Draft Plan projects.

- 3.4-B.2 Prior to constructing any project that would involve disturbance of earth outside road or trail beds or other areas previously disturbed when constructing the road and trail system. MMWD staff shall review Figure 21 of the *Mount Tamalpais Area Vegetation Management Plan Draft EIR*. If the project is located within an area that is mapped as "archaeologically sensitive," then the site shall be field surveyed by a qualified archaeological consultant who shall make recommendations and develop proposals for any procedures deemed appropriate to further investigate and/or mitigate adverse impacts to those resources.
- 3.4-B.3 If cultural resources are discovered on a site during field surveys or during subsequent construction activities, all earthmoving activity in the area of impact shall be halted until a qualified archaeological consultant examines the findings, assesses their significance, and develops proposals for any procedures deemed appropriate to further investigate and/or mitigate adverse impacts to those resources.
- 3.4-B.4 In the event that human skeletal remains are discovered, work shall be discontinued in the area of the discovery and the County Coroner shall be contacted. If skeletal remains are found to be prehistoric Native American remains, the Coroner shall call the Native American Heritage Commission within 24 hours. The Commission will identify the person(s) it believes to be the "Most Likely Descendant" of the deceased Native American. The Most Likely Descendant would be responsible for recommending the disposition and treatment of the remains. The Most Likely Descendant may make recommendations to the landowner or the person responsible for the excavation/grading work for means of treating or disposing of the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

#### Impact Significance After Mitigation

These mitigation measures ensure that any cultural remains that could be damaged by Draft Plan projects will be preserved or appropriately studied, referenced, and/or curated. Human remains would be treated in an appropriate legal and humane fashion. These mitigations would reduce the impact to a **less than significant** level.

### **D. Geology and Soils**

Most projects included in the Draft Plan involve grading that would not pose a significant risk of landsliding or slope failure. However, there are three types of projects that might require engineering to address unstable or expansive soils, including the placement of bridges, construction of crib walls or retaining walls where roads are very near a stream and there is not room to construct an adequate width of roadway, and construction of retaining walls at certain locations. In addition trail and road reroutes would need to be assessed by a geotechnical expert to make sure that they were not constructed in areas with unstable slopes and/or cause landsliding. To address these **potentially significant** slope stability impacts, the following measure would be implemented:

- 3.4-C.1 MMWD will have a geotechnical engineer consult in the design of any road bridge project or retaining walls on the Watershed. Major trail and road reroutes will be reviewed by a geologist or geotechnical engineer. The recommendations of the geologist or geotechnical engineer regarding location, design, and/or construction of the trail or road will be included in the final trail or road reroute plan.

Impact Significance After Mitigation

This mitigation ensures that bridges, retaining walls, and new trails and roads would not fail due to unstable soils. The impact would be reduced to a level that is **less than significant**.

**D. Noise**

Construction of projects will use heavy equipment. If a project is near an existing residence, this construction noise can significantly affect the residents of nearby homes. To mitigate this **potentially significant impact**, the following measures will be implemented:

- 3.4-D.1 Project construction in areas within one-quarter mile of a private residence shall be limited to the hours of 7:30 a.m. to 5:00 p.m. on weekdays. No work shall be allowed on Saturdays, Sundays, or holidays.

Impact Significance After Mitigation

The mitigation measure ensures that construction noise would not bother nearby residences outside of normal working hours on weekdays or on weekends and holidays. This would reduce the impact to a **less than significant** level.



## 4.0 TOPICAL ISSUES AND IMPACT ANALYSIS CHAPTER

## 4.0 TOPICAL ISSUES AND IMPACT SUMMARIES CHAPTER

### 4.1 GROWTH-INDUCING IMPACTS

CEQA mandates that an EIR assess potential growth-inducing impacts of a project. The *CEQA Guidelines* describe the required assessment in the following way:

*Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment (CEQA Guidelines, Section 15126.2(d)).*

Growth-inducing impacts usually arise when a project would provide new infrastructure or public services that can be used to serve other projects. Because the project does not include construction of residences, new commercial/industrial development, or public access roads or other infrastructure, it would not cause new growth in the area. The Draft Plan would not have growth-inducing impacts.

### 4.2 CUMULATIVE IMPACTS

Other projects occurring on the Watershed include ongoing implementation of the District's *Lagunitas Creek Sediment and Riparian Management Plan* and its *Mount Tamalpais Area Vegetation Management Plan*. Other nearby projects that could combine with the Draft Plan to have cumulative effects on the environment include the proposed *Cascade Canyon and White Hill Open Space Preserves Land Management Plan*, the *Big Lagoon Wetland and Creek Restoration Project*, the *Marin Stables Redevelopment Project*, and the *Concrete Pipe Road Pipeline Replacement Project*. Each of these plans and projects is discussed below.

#### **Lagunitas Creek Sediment and Riparian Management Plan**

The *Lagunitas Creek Sediment and Riparian Management Plan* is an adopted plan to construct a variety of stream and riparian improvement projects on Lagunitas Creek downstream of Peters Dam. Like the Draft Plan assessed in this EIR, Lagunitas Creek Plan contains a number of discrete projects which, together, will improve habitat for fish and other aquatic species inhabiting Lagunitas Creek. Each year, MMWD provides the Army Corps, the Department of Fish and Game, RWQCB, and the County with a list of projects to be accomplished that year. The Corps determines the appropriate permit for this work, and RWQCB may include specific

conditions on one or more of the projects to ensure that the projects do not cause substantial project-generated erosion and sedimentation.

If Draft Plan projects draining to Lagunitas Creek below Peters Dam occurred during the same season as these Lagunitas Creek projects, there could be a cumulative increase in sedimentation of the creek. However, there are only about 27 projects in that watershed. Nine of those projects would be associated with decommissioning the roads on the west side of Lagunitas Creek. Decommissioning these roads, especially the one immediately adjacent to the creek, would have the most potential for combining with projects carried out under the *Lagunitas Creek Sediment and Riparian Management Plan* and its *Vegetation Management Plan* to result in cumulative impacts.

However, the BMPs and other mitigation measures included in this EIR combined with any additional conditions established by the Army Corps, RWQCB, or California Department of Fish and Game for Draft Plan projects in the watershed below Peters Dam and future Lagunitas Creek Plan projects should reduce the project-specific and the cumulative construction-generated impacts to a less than significant level. Beyond the construction phase, the cumulative impacts of constructing projects under the two plans would be beneficial.

### **Mount Tamalpais Area Vegetation Management Plan**

The *Mount Tamalpais Area Vegetation Management Plan* (VMP) was adopted by MMWD in 1994 to guide fire hazard reduction and vegetation management activities on the Watershed. This is a 10-year plan, and MMWD is currently considering updating the plan. The primary actions that have been taken are machine and hand cutting of fuel reduction zones along critical fire roads, cutting and pile burning of chaparral in a few fuel reduction zones, removing non-native pines and broom, and conducting prescribed burning to restore grassland and oak woodland/savanna habitats. The Plan included provisions for prescribed burning of chaparral to reduce fire hazard, but this type of project has not been carried out because of the difficulty in meeting the prescription and safety concerns. The cutting of vegetation does not result in significant bared soil that causes erosion and sedimentation. So, these projects, which comprise most of the vegetation management projects aimed at reducing fire hazard, should not combine with Draft Plan projects to cause a significant cumulative sedimentation impact.

Controlled burning of meadows and oak woodlands/savanna can result in erosion and sedimentation. However, the areas that have been burned are primarily on flatter land in the area around Bon Tempe and Lagunitas Lakes. Even if these future burn projects were to occur at the same time as Draft Plan projects in the same area, the impact would not be expected to be significant because 1) the area drains to reservoirs and would not affect streams supporting Special Status Species of fish and other aquatic life; 2) the projects included in the Draft Plan will be conducted in such a fashion as to generate minimal sedimentation so that the project's contribution to the impact would not be cumulatively considerable; 3) prescribed burning projects occur prior to the rainy season so that the first rains of the year generally reestablish grassland areas; and 4) projects under both plans result or will result in improved natural habitat, thereby creating a long-term benefit to water quality, plants, and animals.

To summarize, the combination of projects occurring under the two existing resource management plans plus the Draft Plan could create some cumulative sedimentation. However, the BMPs and mitigation measures recommended for the Draft Plan would reduce the amount

of sedimentation generated by Draft Plan projects to a level where these projects would not make a cumulatively considerable contribution to the cumulative impact. In addition, the projects in these other two plans are also conducted using BMPs that reduce project-generated erosion. It is not expected that the short-term cumulative impacts resulting from projects conducted under these three plans would be significant.

The VMP will also result in changes to plant and wildlife habitat. The cutting of vegetation to create fuelbreaks (including those areas where chaparral is cut and the cut material is burned in piles) will result in younger stands of chaparral, but the EIR prepared for the VMP found this would not be a significant impact. Removal of non-native pines and broom benefits the plant and animal communities. Prescribed burning of grasslands and understory burning of oak woodlands also benefits those communities. The changes to vegetation and wildlife habitat resulting from projects included in the Draft Plan also have a long-term beneficial impact on plants and animals. As described in Sections 3.2 and 3.3, short-term, construction-related impacts to plants and animals would be less than significant. The EIR prepared for the VMP found that short-term impacts to plants and animals would be less than significant, except for the impacts of prescribed burning on some wildlife. The projects in the Draft Plan do not include prescribed burning plus they would not be expected to result in significant animals deaths or injuries, given implementation of mitigations recommended in this EIR. It is not expected that the combined short-term, construction-related impacts of the projects implemented under the Draft Plan plus the VMP would result in any cumulatively significant impacts on plants or animals. The long-term cumulative impacts to plants and animals from projects implemented under the two plans would be beneficial.

### **Cascade Canyon and White Hill Open Space Preserves Draft Management Plan**

A third related project occurring in the area is the *Cascade Canyon and White Hill Open Space Preserves Draft Management Plan* (Leonard Charles and Associates, 2000). This management plan was prepared for two open space preserves owned and managed by the Marin County Open Space District (MCOSD) located adjacent to the Watershed. A Draft EIR on the plan has been prepared and circulated for public review; currently, a Final EIR is being prepared for this plan. The plan provides resource preservation and management recommendations for these preserves. Similar to MMWD's Draft Plan, the MCOSD plan contains detailed recommendations for controlling erosion and sedimentation on the preserves' streams (which drain to San Anselmo and Fairfax Creeks which are tributaries of Corte Madera Creek). Implementation of these recommendations will reduce the amount of sediment entering those creeks. These projects would combine with the projects under the Draft Plan to have a beneficial impact on water quality and aquatic life in San Anselmo, Fairfax, and Corte Madera Creeks. The short-term, construction generated impacts of developing erosion control projects on the MMWD preserves would be minimized by mitigation measures and BMPs included in the plan and the EIR on that plan. While it is possible that sedimentation from projects on the Watershed and these preserves might combine to generate more sediment in San Anselmo Creek than would be the case for projects in just one of the jurisdictions, this cumulative increase would be expected to be less than significant, given the erosion control BMPs required for all these projects.

The MCOSD plan calls for constructing two new trails, rerouting other trails, and decommissioning or closing several trails and road sections. Similar to MMWD's Draft Plan, the overall impact would be beneficial to plants and animals as there would be more habitat

available and larger blocks of untrailed or unroaded habitat. New trails would be constructed only after erosion control projects at other sites that would reduce the overall sediment generation to a below baseline condition have been completed. It is not expected that the projects included in the two plans would combine to have an adverse effect on wildlife and plants. Construction-generated impact on natural habitat would be mitigated by mitigation measures in the EIR for the MCOSD plan. It is not expected that construction-generated impacts of projects under the two plans would combine to generate a new or more substantial cumulative impact.

The MCOSD plan calls for closing the Happersberger Trail. This trail extends onto the Watershed. It is not a system trail, however, the Draft Plan does not call for explicit decommissioning of this trail (because the Draft Plan does not identify non-system trails and what decommissioning may be implemented on said trails). It is recommended that MMWD consider active decommissioning of this trail if the Final Plan for the preserves MCOSD decides to close this trail. This would provide a substantial amount of wildlife habitat along the ridge that this trail traverses.

The MCOSD plan recommends that MCOSD adopt the Split Rock Trail as part of its official trail system. However, because this trail was illegally constructed, the District may opt to adopt and maintain a non-system trail along Cascade Creek instead of the Split Rock Trail. In that case, MCOSD may decide to close or decommission Split Rock Trail. This trail also extends onto the Watershed. If MCOSD decides to officially close and decommission this trail, MMWD should consider active decommissioning of its portion of said trail.

### **Big Lagoon Wetland and Creek Restoration Project**

The National Park Service (NPS) and the Golden Gate National Parks Conservancy have proposed alternatives to restore Redwood Creek and Big Lagoon in the area where the creek enters the ocean. NPS is currently hiring a consultant to prepare an EIR/EIS on this proposed project. It is likely that construction of any of the alternatives under consideration would cause sedimentation and turbidity in the area of the lagoon and the lowermost portion of Redwood Creek. The impacts of this construction will be identified as part of the EIR/EIS that will be prepared for this project. It is not expected that the Draft Plan restoration projects on Redwood Creek would significantly add to the sedimentation and turbidity generated by the NPS project. This EIR recommends mitigation measures to ensure that construction-related erosion from Draft Plan projects will be minimized so that the Draft Plan projects would not make a cumulatively considerable contribution to impacts resulting from the Big Lagoon project. It is expected that similar erosion and sedimentation control measures will be required for the NPS project. Over the long term, the cumulative impacts of the two plans on water quality and the biological environment of Redwood Creek and Big Lagoon would be beneficial.

## **Marin Stables Redevelopment Project**

The Marin Stables are located at the end of Wood Lane in the Deer Park area of Fairfax. MMWD is currently negotiating with a group of people who are attempting to form a non-profit group which would redevelop and manage the stable facilities. If and when this group forms, it would need to develop a plan for the redeveloped facilities that would need to obtain a use permit from the County of Marin, including Design Review approval. A CEQA study would be required for the proposal. MMWD would also need to approve these plans. The stables are located in a narrow valley with an intermittent stream flowing beside buildings and paddocks. The County's Draft Countywide Plan calls for 50-foot setbacks from the top of the streambank for small (5 acres or less) infill properties and 100 feet for larger properties. It will be challenging for the future development plan to devise a stables plan that satisfies County stream setback and protection policies.

This potential redevelopment should reduce environmental effects of horses using this facility. Moving the stables outside the Stream Conservation Area would be an environmental benefit. It is not possible at this stage to determine what the effects of the new design might be. It is expected that the CEQA study that would be prepared would address those environmental effects. The Draft Plan includes three projects in the area of the stables and two additional projects immediately uphill on Canyon Trail. It is expected that these projects may be implemented as part of the stables redevelopment. Thus, this possible future project should complement the Draft Plan.

## **Concrete Pipe Road Pipeline Replacement Project**

MMWD is planning to replace a welded steel pipeline installed in the 1920s with a new pipeline. This replacement project is a part of the voter-approved Fire Flow Master Plan (FFMP). The new pipeline will connect with existing pipes on Bolinas-Fairfax Road and extend to the Ross Reservoir. The pipeline would basically follow most of the path of the existing pipeline. This project has two phases. The first phase is in design and includes the line from Bolinas-Fairfax Road to Five Corners. This line will follow the existing lines. In some locations, the old pipe will be removed and replaced with the new line, while in other locations the old line will be left in place, and the new line built next to it. The line has two major stream crossings. The pipes do and will cross these streams on trestles. The pipeline is within the roadbed of Concrete Pipe Road until it nears Five Corners where there are two trestles. At the second trestle, the pipe travels across country for about 150-200 feet before it goes back underground at the road. In the stretch where the pipe is exposed, it is about 75-100 feet below the road on a relatively flat bench vegetated with large, well spaced bay trees.

While constructing this new pipeline, MMWD would also repair the approximately nine Draft Plan projects that are located along this section. The two major stream crossings where the pipe would be carried on trestles and not beneath the road would not be repaired as part of the pipeline replacement project. Construction of the line within the roadbed, while causing interruption of use of the road, would not be expected to cause substantial erosion nor impacts to vegetation. The section where the pipe is on the slope below the road could result in erosion and sedimentation and loss of vegetation. However, given the ease of access to this relatively flat area, and the general lack of vegetation along the route, it is not expected that constructing the pipe in this off-road location would cause substantial erosion or loss of vegetation. The Draft Plan projects would be done at the same time the road was excavated to replace the pipe,

so there would not be any substantial increase in impact from the Draft Plan projects other than from the pipeline replacement itself. Thus, the Draft Plan projects would not make a cumulatively considerable contribution to the impacts resulting from the pipeline replacement project. It should be noted that the erosion control projects along Concrete Pipe Road are projects proposed under the Draft Plan and not the pipeline replacement project. While the erosion control projects would be done while MMWD's contractor was working on the pertinent section of the road, the pipeline replacement and the Draft Plan are two separate projects.

Phase 2 of this project would install the new pipeline from Five Corners to the Ross Reservoir. This route would follow the existing route beneath Five Corners but then would follow Shaver Grade Road rather than Concrete Pipe Road to just above (west) of the Log Cabin. From here it would cross-country above the cabin to again intersect the road, and follow the road to the drinking fountain. From here it would travel cross-country up to the top of the ridge and to the Ross reservoir. Design has not been initiated for this phase of the project. The Draft Plan includes about 25 projects along this route. Again, these projects would be implemented while installing the new pipeline. Thus, the Draft Plan projects would not cumulatively increase the impacts resulting from the pipeline replacement project. While it is not expected that this pipeline replacement project would have significant impacts that could not be mitigated by mitigation measures similar to those recommended in this EIR, the impacts would need to be assessed in the required CEQA study to be done once the design is completed.

## **Summary**

The combination of all the projects under the four plans would be expected to improve water quality and biological health and diversity in the general area surrounding the Watershed. The public agencies promoting these plans have as their aim to improve the ecological situation in the area. Erosion control projects will reduce sedimentation and turbidity in streams draining the Watershed. The improved water quality will benefit listed coho salmon, steelhead, red-legged frogs, yellow-legged frogs, California freshwater shrimp and other fish and aquatic wildlife species. Closing and decommissioning of trail and roads on the Watershed and adjacent open space preserves will benefit wildlife by providing additional wildland habitat and blocks of land with little to no human and dog presence. The decommissioned areas will provide space for recolonization of native plants. The combined long-term impacts of these four plans is beneficial.

Construction of the various projects included in the other plans can cause short-term erosion impacts and short-term loss of plants, and possible injury to wildlife. The projects that would occur under the other adopted plans are subject to mitigation measures and BMPs similar to those required in this EIR, and it is expected that similar BMPs and mitigation measures would be required for the proposed plans and projects. Projects to address erosion problems will be managed to minimize construction-related sediment production. All these projects would be subject to additional requirements established by the RWQCB, the Army Corps, or the California Department of Fish and Game. Projects to decommission roads and trails will be conditioned to minimize construction-generated erosion and to minimize loss of plants and animals. Projects to develop new road and trails section would be done per similar new trail construction guidelines set forth in this EIR. It is expected that the cumulative construction-generated effects on water quality, fish and wildlife habitat, and vegetation would be less than significant.

The redevelopment of the Marin Stables would also be expected to have a benefit on the environment surrounding the stables site. Draft Plan projects along the route of the Concrete Pipe Road Pipeline Replacement project will be implemented when installing the new pipeline. Thus, the Draft Plan projects would not substantially increase the impacts of the pipeline project. It is not expected that the pipeline replacement will have significant impacts. The mitigation measures recommended for the approximately 35 Draft Plan projects along the pipeline route reduce project-generated impacts to a less than significant level so that the project does not make a cumulatively considerable contribution to the pipeline construction impacts.

No additional mitigation measures beyond those recommended in this EIR are needed to reduce potentially significant cumulative impacts from the Draft Plan plus the *Cascade Canyon and White Hill Open Space Preserves Management Plan*, the *Mount Tamalpais Vegetation Management Plan*, and the *Lagunitas Creek Sediment and Riparian Management Plan*. Subsequent project-specific CEQA studies of the proposed Redwood Creek/Big Lagoon project, the Marin Stables redevelopment project, and the Concrete Pipe Road Pipeline Replacement project (Phase 2) would need to identify mitigation measures for those projects, but it is not expected that additional mitigations would be needed for Draft Plan projects near or interacting with those projects. The long-term cumulative impact of all these projects would be **beneficial**. It is expected that the cumulative short-term impacts resulting from construction of discrete projects would be reduced to a **less than significant level**.

### 4.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

The *CEQA Guidelines* require that an EIR discuss irreversible environmental changes that would occur if the project were approved (Section 15126.2[c]). Implementation of the projects included in the Draft Plan would reverse projected erosion from several hundred sources on the Watershed. This would be a beneficial effect. Most impacts identified in this EIR are short-term effects resulting from project construction. The only long-term effects that might be considered adverse are loss of open space, wildlife habitat, and vegetation resulting from the development of the proposed trail and road reroutes. However, this loss is compensated for by the fact that the existing trail and road sections that will be rerouted will become unused open space that will over time become new plant and animal habitat. Proposed decommissioning of several trails and road sections will mean that the public will not use these road and trail sections again; the Draft Plan also provides management direction and recommendations to control the construction of new illegal routes into untrammled areas. However, this is not considered an adverse environmental impact.

### 4.4 PROJECT ALTERNATIVES

CEQA requires that the EIR assess alternatives to the project if the project would have significant environmental impacts, even if these impacts can be mitigated to a level that is less than significant. As noted in Chapter 3.0 of this EIR, the project would have a number of significant impacts. This EIR therefore assesses alternatives to the project.

The *CEQA Guidelines* offer a number of requirements and recommendations regarding the alternatives analysis. The more pertinent issues are summarized as follows:



1. A range of reasonable alternatives must be assessed. The range must be sufficient to permit a reasonable choice of alternatives so far as environmental aspects are concerned. The EIR need not assess multiple variations of alternatives. The range of alternatives to be assessed is governed by the rule of reason.
2. Alternatives must be ones that could feasibly attain most of the basic objectives of the proposed project. While alternatives can impede the attainment of the objectives, they should not substantially impede those objectives. Alternatives that fundamentally change the nature of the project do not meet the basic objectives of the project.
3. The alternatives must be feasible. Feasibility takes into account factors such as site suitability, economic viability, availability of infrastructure, consistency with the General Plan, other plans and regulatory limitations, jurisdictional boundaries, and ability to acquire, control, or gain access to alternative sites.
4. The analysis of the alternative must determine whether the alternative reduces the significant impacts identified for the project. If the alternative would generate additional significant impacts, those must be identified and discussed.
5. One of the alternatives to be assessed must be the “no project” alternative.
6. The EIR must assess the identified alternatives and determine which among the alternatives (including the project as proposed) is the environmentally superior alternative. If the no project alternative is identified as the environmentally superior alternative, then another of the alternatives must be identified as the environmentally superior alternative among the remaining alternatives.

Given these mandates, this EIR assesses the following alternatives:

1. No project
2. No trail and road decommissioning

Typically, an EIR would include analysis and comparison of three or more alternatives to the project as proposed. However, this is a unique project in that it has as its goal to improve environmental quality through implementation of a comprehensive list of projects based on detailed techniques. There are not many feasible alternatives that would meet these restoration and environmental enhancement objectives. The subsection below discusses some alternatives that were considered but rejected for further analysis. Following that subsection is a discussion of the two feasible alternatives to the project.

### **Alternatives Considered But Rejected**

One alternative that was considered was to substitute different types of erosion control treatment at some number of the project sites. It was determined that the techniques were developed by a firm that is considered one of the foremost companies involved with road and trail sedimentation management. This firm is the author of *Handbook for Forest and Ranch Roads - A Guide for Planning, Designing, Constructing, Reconstructing, Maintaining and Closing Wildland Roads* (Pacific Watershed Associates 1994) which is considered one of the

standard texts for new road construction and repairing existing roads. It was concluded that revisiting the techniques recommended for the various sites would not be a useful exercise.

A second alternative considered was to look at the entire Watershed to determine where the best locations would be for an ideal road and trail system, that is, prepare a road and trail plan as if the Watershed were a new area being opened for public access. This plan might result in a substantially different road and trail system, a road and trail system that would generate substantially less erosion, might provide much larger blocks of wildlife habitat absent trails and roads, and might substantially reduce trail and road redundancy. However, it was determined that such a plan would 1) be infeasible on the basis of the cost it would take to undertake this huge effort to close and decommission tens if not hundreds of miles of roads and trails and construct new roads and trails (at least in some locations); 2) would likely generate more short-term erosion and sedimentation than the Draft Plan projects; 3) generate more short-term impacts to vegetation, wildlife, noise, and air resources than the Draft Plan, and 4) would be so controversial that it could take years to ever be adopted, thereby not addressing the key objective of the Draft Plan, to reduce sedimentation of streams.

A third alternative considered was one that entailed recommending closing and decommissioning of additional trail and roads on the Watershed. It was concluded that such recommendations would be as much a public policy matter as an environmental issue. While one can certainly make the argument that water quality, biological resources, cultural resources, and other resources would be least impacted if the Watershed were not open to public use, such closure would be infeasible. MMWD staff has expended significant resources identifying unneeded trails and roads that could feasibly be closed and decommissioned. Earlier versions of the Draft Plan recommended decommissioning even more routes than the number proposed in the current draft of the Plan. Members of the public and other agencies, in reviewing and commenting on the planning process, ultimately helped influence the currently recommended official system of roads and trails. Nearly all sub-watersheds in the study area have road densities that exceed maximum levels beyond which hydrological functions are impaired (Cedarholm 1983 and NOAA - Fisheries 1996).

A fourth alternative was one that would include additional non-system trails that would be added to the road and trail system. Particular trails mentioned by people commenting on the Draft Plan as it was being prepared include: California Riding and Hiking, No Name, Alice Eastwood (adopt and repair), Murray, Music Stand, Redwood Spring, and Zig-Zag Trails. However, adoption of these trails is more a policy matter than an environmental issue. Adoption of these trails would create additional management and maintenance requirements for staff. The Watershed already has ample roads and trails (Cedarholm 1983 and NOAA - Fisheries 1996). Adopting additional new routes would not be consistent with the stated goals and objectives of the plan.

## **Alternative 1 – No Project**

CEQA requires that an EIR address the “no project” alternative. This alternative would maintain the status quo. Thus, over time, some erosion control projects might occur, but there would not be an aggressive, coordinated approach to erosion control. Twelve roads and trails that are proposed for decommissioning would be left open to use. Seven system roads would not be converted to either Class IV roads or trails. Eleven trails recommended to become part of the system would remain non-system trails. Bon Tempe Road would not be paved. There would

be no adopted action plan for controlling the construction of new, illegal trails. The alternative would have the following effects.

#### *Infrastructure*

Because stream crossings would not be improved, some to many of these crossings could fail during future major storm events. These failures would make it impossible for MMWD staff or other emergency responders to use the affected portion of the road system until after the storm event and a new crossing could be provided. Reconstruction of the crossing would likely follow the design recommendations in the Draft Plan, so the long-term effects would be the same, except for the fact that all the soil in the failed crossing would have been washed into the stream downstream from the crossing.

#### *Hydrology*

If the projects included in the Draft Plan were not constructed, as much as 186,305 cubic yards of soil could enter streams on the Watershed and draining the Watershed. This additional sediment would adversely affect the water quality of the receiving streams and Watershed reservoirs. The additional sediment would reduce the useful life of the reservoirs.

Vehicle use of roads proposed for decommissioning or converting to a type of road or a trail that receives little or no vehicle use would cause more persistent erosion than would occur under the Draft Plan. Not adopting the eleven proposed non-system trails as part of the system means they will be less likely to receive normal maintenance, thereby increasing erosion potential on this trails. Not paving Bon Tempe Road will result in additional erosion from that road. Not constructing the trail and road reroutes will mean there would be increased erosion from these overly steep trails and roads.

#### *Vegetation*

Minor wetlands (e.g., roadside seeps) would not be affected. No work would take place within stream channels so there would be no loss of riparian vegetation. However, subsequent failures of fill stream crossings would destroy or damage the vegetation on these fills and have an adverse effect on "waters of the U.S." There would be no vegetation lost due to constructing new road and trail sections to replace the overly steep portions of the eight road and trail sections proposed for rerouting. However, the rerouting would allow revegetation of the old, abandoned part of the trail or road. The decommissioning of roads and trail proposed as part of the Draft Plan would not occur. Thus, the eventual revegetation of those abandoned roads and trails would not occur. There would be no adopted action plan for controlling the construction of new, illegal trails.

## *Wildlife*

The sediment that would enter streams from erosion sources would adversely impact the streambeds, reducing the quality of spawning gravels used by salmonids and adversely affecting California freshwater shrimp and yellow-legged frog habitat. The increased turbidity would adversely affect coho, steelhead, yellow-legged frogs, red-legged frogs, and other aquatic species. Not decommissioning the thirteen roads and trails would mean current impacts of human use and presence on wildlife inhabiting the areas through which these roads and trails pass would continue. There would continue to be too high a density of trails/roads in these areas.

## *Other Resources*

No cultural resources would be affected. There would not be a need for geotechnical engineering or planning. No dust or noise would be generated by project construction. However, replacing failed fill sections and other road and trail failures would require the use of heavy equipment which would potentially generate dust and noise similar to that described for the proposed project. There would be no impact on recreational use of the Watershed. People would be able to continue to use all trails and roads that they currently use.

## *Summary*

The long-term beneficial impacts of the proposed project would not occur. There would be increased erosion over the next twenty years with adverse impacts on water quality and aquatic species. The road system would not be storm-proofed which would not only mean more erosion but possible road failure at stream crossings. Over time, MMWD would need to conduct more road and trail maintenance than they would if the roads and trails were "storm-proofed." Not decommissioning target roads and trails would maintain existing use levels thereby not benefiting plants and wildlife. There would be no adopted action plan for controlling the construction of new, illegal trails. The alternative would have more significant environmental impacts than the proposed project.

## **Alternative 2 – No Road or Trail Decommissioning**

This alternative would include all erosion control projects, trail/road reroutes, road paving, and road conversions proposed in the Draft Plan. It would not include decommissioning the proposed portions of eight roads and four trails. This alternative was selected for analysis because at public meetings the District held while developing the Draft Plan, there were a number of individuals who stated that one or more of the roads/trails proposed for decommissioning should be left open to use.

As was explained in the Initial Study (see Appendix A of this EIR), the closure and decommissioning of these roads and trails may affect the user experience of certain individuals who use these roads/trails. However, MMWD provides ample roads and trails to all major parts of the Watershed. As the Draft Plan (pages 2.6 to 2.7) states:

*District policy directs it to be a steward of its Watershed lands, comply with laws protecting endangered or threatened species, and minimize its impact on the natural ecological functions in the Watershed. In general, this plan provides for no new roads or trails to be built on the*

Watershed, except in a few cases where re-routes are considered to reduce a route's overall impact on the environment (less than 1% of the entire network). An example would be to relocate a road or trail further away from a creek.

Land managers and scientists involved with restoring endangered salmon and steelhead populations use densities of roads (expressed as miles of road per square mile of land) as a general index of watershed health (Cedarholm et al 1983; National Marine Fisheries Service 1996). Densities greater than 2.5-mi./sq mi. are thought to impair properly functioning watershed conditions. Densities of roads and trails are shown in Table 2.2 for the various sub-watersheds within the Watershed. For many sub-watersheds with fish bearing streams (i.e. Deer Park, Redwood Creek, Lagunitas Creek) road densities range from 5.7 to 6.3 mi/sq. mi. Trail densities are extremely high in some sub-watersheds as well. These findings affirm that no new roads or trails should be built on Watershed lands.

<b>BASIN</b>	<b>ROAD DENSITY (mi/sq)</b>	<b>TRAIL DENSITY (MI/SQ)</b>
Arroyo Corte Madera	4.6	7.2
Old Mill Creek	6.3	6.9
Larkspur	12.6	3.0
Redwood Creek	6.2	6.2
Ross Creek	11.8	1.0
Phoenix Lake	6.2	7.0
Lake Lagunitas	2.7	5.7
Deer Park	5.7	8.3
Bon Tempe Lake	5.0	9.8
Alpine Lake	2.9	5.6
Cascade Canyon	2.4	2.8
Kent Lake	2.5	1.1
Lagunitas Creek	6.0	1.1

Table 2.2 Road densities are high in basins with fish bearing streams.\*

\* This table is from the Draft Plan

Possible reasons for the recommendation to decommission the roads/trails were: 1) the road/trail was overly steep and was causing erosion and sedimentation of streams; 2) the trail/road adversely impacts biological habitat or resources; 3) the trail/road was difficult or expensive to manage and patrol; and 4) the trail/road is redundant, particularly given its other impacts. The trails/roads proposed for closure and decommissioning were walked by the EIR preparers to generally assess the routes. This assessment was qualitative and not quantitative in nature. The following summarizes the potential effects of maintaining and not closing/decommissioning each target road and trail. Each target road and trail is shown on Figure 6.

### *Lagoon Road*

Approximately 3,400 feet of this road would be decommissioned. The road provides access along the top of a northwest trending ridge, providing views of Douglas fir forest and chaparral communities. It starts at Lagunitas-Rock Springs Road and soon crosses Upper Berry Trail (which is also proposed for decommissioning; see below) and Cross Country Boy's Trail. Near its north end, it intersects Kent Trail, and Lagoon Trail Extension starts at its northern terminus. This road is mainly stable. There are a few locations where there is minor gulying of the road surface, and the Draft Plan calls for installing rolling dips in two locations. These are required regardless of whether the road is decommissioned or left open. If the road were left open as a road, it would need to be graded on a regular basis. The grading plus future use would result in potential erosion.

The road is not needed for access as Cross County Boy's Trail and Kent Trail have numerous other access points. Closure of the road would provide a ridgetop area where people and dogs would be infrequent visitors, especially once the chaparral community along most of the road recolonized the road. While maintaining this road would not be expected to have significant environmental impacts, it would decrease the ability of MMWD to enhance the environment of the area through which the road passes.

### *Upper Berry Trail*

This trail provides access between Lagunitas-Rock Springs Road (near Rifle Camp) to Lagoon Fire Road and Cross County Boy's Trail. The trail has a number of sections that have some erosion. However, much of the trail passes through a Douglas fir forest where there is not substantial erosion. Leaving it open would require future management and some erosion control in eroding sections. While leaving this trail open would not be expected to have significant environmental effects, assuming some erosion control where needed, it would decrease the ability of MMWD to enhance the environment of the area through which the trail passes.

### *Lower Portion of Grassy Slope Road*

Approximately 2,000 feet of the lower portion of this road is slated for decommissioning. The road is relatively steep. But has been recently graded and does not show signs of significant erosion. Runoff down the slope is currently captured on an inboard ditch along the lower east-west running part of the road. This runoff flows over the bank towards Continental Cove Road and down to Kent Lake, causing a significant gully. This gulying would be addressed as part of decommissioning of this road section. This road is not needed to provide access from the lakeside road (Upper Peters Dam Road) to San Geronimo Ridge Road at the top of the ridge. Continental Cove Road immediately to the east of Grassy Slope Road provides the same access.

The section of this road proposed for decommissioning connects to a road that MMWD recently decommissioned. Together the decommissioned roads would provide additional undisturbed wildlife habitat plus additional area for native plant recolonization.

The primary benefits of decommissioning this road section would be to reduce maintenance requirements, reduce erosion and sedimentation, and provide additional wildlife habitat that is

not, or little, disturbed by people and dogs. There is a road immediately to the east that provides the same road connection that Grassy Slope Road provides. Maintaining the road as part of the system would mean that MMWD would need to continue to grade and maintain this road; erosion from the road would continue to enter Kent Lake and cause severe gullying above the lake; wildlife sensitive to human and dog presence would continue to avoid the area near the road. Users who enjoy walking and riding on the road would continue to be able to do so.

#### *End of Worn Springs Road*

About 280 feet of the end of this road would be decommissioned. A new trail would be constructed to provide the same access as is provided by the section of road to be closed. There is no benefit to not decommissioning this road section. Maintaining it would mean MMWD would need to continue to conduct erosion control on this eroding section of road.

#### *End of Oat Hill Road*

About 700 feet of this dead-end road would be decommissioned. The road does not provide access to any other trails or roads. It is likely very lightly used. Its closure would allow plant recolonization and provide some additional wildlife habitat. Leaving it open would require continued maintenance. The few people who do use it would be able to continue to do so.

#### *Laurel Dell Road*

Retaining the existing road access between Laurel Dell Road and Barth's Retreat would mean the District would need to continue to fix erosion problems on this steep section of road. The road passes through an area that supports serpentine chaparral, including Special Status Species of plants. Closing the road would allow it to be recolonized by this serpentine chaparral community. A new trail would be constructed to continue to provide access to Barth's Retreat. The only effect on recreational uses is that bicyclists would not have access to Barth's Retreat. Leaving the road open would allow bicyclists to continue to be able to access Barth's Retreat.

#### *Interior Pine Point Road*

This road cuts north-south across a peninsula (Pine Point) that extends into the southeastern part of Bon Tempe Lake. The road is paralleled immediately to the east by a trail that provides similar access between Bone Yard Road and Pine Point Trail. Pine Point Trail follows the lake edge to the west and provides a second north-south access route. Because it intersects a trail at its north end, it does not provide a bicycle route. The road is redundant. It passes primarily through grasslands that MMWD has been working to restore. Decommissioning this road would further these restoration efforts. The road shows little to no signs of active erosion. Its closure would not provide a significant benefit to wildlife, given the proximity of trails to the east and west.

To summarize, the main benefits of decommissioning this road would be to reduce maintenance requirements and enhance meadow restoration. Maintaining the road as part of the system would result in ongoing MMWD maintenance of an unneeded road. It would detract from MMWD's ability to restore native grasslands in this area. People who enjoy walking and riding on the road would be able to continue to do so. The continued use would create some erosion

due to ongoing grading, but the delivery to streams could be controlled by installation of rolling dips and other control measures.

#### *Bare Knoll Road*

About 1,700 feet of this road would be decommissioned. The road appears to be an old fire trail graded along the top of a ridge. It provides access between Laurel Dell Road and High Marsh Trail. However, access to High Marsh Trail from this same road is provided 0.1 mile east of the Laurel Dell Road/Bare Knoll Road intersection. The road is stable. If left open it would require ongoing grading and maintenance. Leaving it open would also not allow recolonization by woodland and grassland species and would not provide additional wildlife habitat not visited on a regular basis by people and dogs. While maintaining this road would not be expected to have significant environmental impacts, it would decrease the ability of MMWD to enhance the environment of the area through which the road passes.

#### *Peters Dam (Miscellaneous Roads)*

About 1,200 feet of roads in this area would be decommissioned. The primary road closure is a loop of road on the west side of Lagunitas Creek below Peters Dam. One leg of this road is immediately above the creek and is likely used by people who want to walk along the creek, perhaps trying to see spawning salmon. The roads are not needed to provide access from Sir Francis Drake Boulevard to Kent Lake, as the main road on the west side would be left open. In addition there is the road on the east side of Lagunitas Creek which provides access along Lagunitas Creek and to Kent Lake.

Decommissioning these roads would increase the mixed conifer woodland habitat on the west side of the creek. It would reduce potential erosion into this most sensitive stream section on the Watershed. It would reduce human and dog presence that might enter the stream adversely affecting spawning or young salmonids. It would reduce human- and dog-caused noise along the creek, thereby benefiting spawning salmon. People who want to see the spawning grounds would still have the road on the east side of the stream, and this road is more easily accessed by the new Inkwells bridge that crosses the creek on the other side of Sir Francis Drake Boulevard.

To summarize, closing these roads would benefit salmon and other aquatic species by reducing human and dog presence near spawning areas. Maintaining the roads would require ongoing MMWD maintenance. Their use would result in additional erosion and stream sedimentation. Most importantly, their closure would provide additional natural buffer along an important spawning area of the creek. If the roads were not closed, people who currently use the roads would be able to continue to do so.



### *Upper Portion of Little Carson Trail*

The Draft Plan calls for decommissioning the existing signed access trail from Oat Hill Road to the head of Carson Falls. Closing and decommissioning this trail would result in restoration of the grassland community through which this trail passes. This would be of some benefit to raptors and other birds that forage in grasslands as it would mean the upper end of the Little Carson Valley would be free of trails. Birds and other animals that nest or breed in these grasslands would benefit from this closure. The trail has a number of areas experiencing active erosion. Continued use, even if Draft Plan-recommended projects on the trail are implemented, would continue to cause erosion resulting in the loss of additional vegetation as the trail widens to avoid eroded or unstable areas.

Conversely, keeping the trail open would likely result in increased erosion. While erosion control projects can be implemented to control the erosion getting to Little Carson Creek, other erosion (that does not enter the stream) would likely continue due to the grade in several sections being too steep, the trail being routed along the head of an unstable area, and other problems. This trail is already much wider than most hiker trails on the Watershed. Its continued use would not provide additional wildlife habitat in the upper end of Little Carson Valley.

Recreational users would likely prefer the recommended access route to Carson Falls, as it has a better grade and travels through more diverse and interesting vegetation communities. From a recreational perspective, the loss of this trail should not be significant.

### *Ridge Trail*

This trail (about 3,500 feet long) is located in the Deer Park area. The Draft Plan recommends decommissioning because it is overly steep at each end and it is not needed. The trail is quite steep as it climbs from near the creek on School Troop Loop Trail. Though this section is quite steep, there is no sign of significant erosion along this section. After this initial climb, the trail follows a ridge and does not show signs of significant erosion. It is also steep where it meets the Moore Trail, but this is a relatively short section. This section could be rerouted to minimize the safety problem with the steep access. While the east end of the trail (i.e., near Deer Park) currently does not show signs of significant erosion, such erosion could occur in the future if the trail became better known and more used.

The trail is not needed to provide access between Deer Park and trails to the west (Moore Trail with connections to Canyon Trail up to the Sky Oaks area). The trail does travel along a somewhat isolated ridge which presents panoramic views and a sense of isolation somewhat rare in the Deer Park area. It appears that this trail receives relatively heavy use, based on the two days that the EIR preparers walked it, apparently more use than the other trail and roads proposed for decommissioning. Its closure would provide an area that could be used by wildlife with little interruption from people and their dogs. Given the generally dense road/trail system in the Deer Park area, this would benefit wildlife sensitive to human and dog presence.

Its closure would allow revegetation by native plants, though the trail is not particularly wide and would likely be retained as a game trail, so the revegetation would not be substantial. Closure would also mean that MMWD staff would no longer need to maintain or patrol the trail.

To summarize, the primary benefits of closing this trail would be to reduce maintenance requirements and to provide habitat for wildlife sensitive to human and dog presence in an area that has a substantial trail/road density. Retaining the trail as part of the system would continue maintenance requirements, and maintain human and dog presence along a relatively isolated ridge so that wildlife sensitive to such intrusion would continue to avoid areas near the trail. People who currently use the trail would be able to continue to do so.

### *Boy Scout Road*

This road would be decommissioned as a road. A trail would be constructed on or near the roadbed to provide the same trail connection, so there would be no impact on recreational users except bicyclists. The road is a 600-foot dead-end, so it is unlikely to be heavily used by bicyclists. There would be no advantage to leaving this road open as a road. It would require ongoing maintenance to fix erosion sources. There would be a decrease opportunity for native plants to recolonize much of the roadbed.

### *Lower Portion of Telephone Trail*

About 1,750 feet of this very steep trail would be decommissioned. This trail was originally developed to allow installation of the telephone poles that carry the telephone line to the top of Mt. Tamalpais. The trail is very difficult to locate at its top end where it enters the State Park. Its lower end is an unsigned intersection with the Temelpa Trail. Because the trail must be left open to provide telephone company access to the poles, decommissioning will likely include closing off the ends, especially at Temelpa Trail. The trail is not needed as Temelpa Trail provides a much better route to the top of the mountain, plus it provides panoramic views which are not possible on the Telephone Trail. Closing this trail would provide additional wildlife habitat. Leaving the trail open would allow hikers to continue to use this very steep trail through a dense and tall stand of chaparral. The trail has some severe erosion (though eroded sediment from this trail does not enter streams). These areas of erosion would need to be addressed whether or not the trail is decommissioned, since the trail needs to be left open for telephone company access.

### **Summary**

Leaving these thirteen trails and roads open would reduce the ability of the District to eliminate maintenance and management responsibilities, eliminate potential erosion sources, and provide additional plant and wildlife habitat. However, except for the roads below Peters Dam, leaving these roads and trails open would not be expected to have significant impacts on environmental resources, assuming implementation and maintenance of erosion control features on the roads and trails. The roads below Peters Dam should be decommissioned due to their proximity to Lagunitas Creek and the coho salmon population that spawns in that area.

While retaining the other roads and trails as part of the system may not have significant adverse impacts, the impacts of this alternative are greater than the Draft Plan which recommends closure and decommissioning of these roads and trails. This alternative is not environmentally superior to the proposed project. Some people may find this alternative superior because it provides more recreational opportunities than the Draft Plan. However, the watershed provides ample hiking, bicycling, and equestrian opportunities. The closure of ten roads and trail (two of

the decommissions would include new trail routes that provide the same access opportunities) is an insignificant change to the recreational opportunities present on the Watershed.

## COMPARISON OF ALTERNATIVES

CEQA requires that an EIR identify the environmentally superior alternative. If the environmentally superior alternative is determined to be the "No Project" alternative, then the second most environmentally superior alternative must be identified. The following is a comparison of the alternatives.

**Alternative 1**, the no project alternative, would maintain the status quo. Thus, some erosion control projects might occur, but there would not be an aggressive, coordinated approach to erosion control. There would be no adopted action plan for controlling the construction of new, illegal trails. Twelve roads and trails that are proposed for decommissioning would be left open to use. Seven system roads would not be converted to either Class IV roads or trails. Twelve trails recommended to become part of the system would remain non-system trails. Bon Tempe Road would not be paved. This alternative would result in ongoing erosion and sedimentation with corresponding long-term adverse impacts on water quality, streambed conditions, vegetation, and wildlife. There would be no short-term, construction-generated impacts, and, thus, no need for mitigation measures to reduce those impacts. However, these short-term impacts can be reduced to a less than significant level by mitigation measures recommended in this EIR. This alternative would not meet the project objectives and would result in more significant impacts to environmental resources than the proposed Draft Plan.

**Alternative 2**, the "no trail and road decommissioning" alternative, would result in the 13 trails and road sections targeted for decommissioning to remain open. This would result in more erosion and sediment delivery than the Draft Plan. The alternative would not increase the amount of native habitat on the Watershed and would not open up 290 feet of streambed. Wildlife residing in the areas near the trails and road sections would continue to experience human and dog presence in the area. MMWD would need to continue to maintain and patrol these trails and roads. The only benefit of this alternative is that Watershed visitors would be able to continue to use these trails and road sections. Given the extensive Watershed road and trail system available to the public and the environmental benefits that would result from the Draft Plan-recommended decommissions, this alternative is not superior to the Draft Plan.

Neither of these alternatives has the long-term environmental benefits of the Draft Plan. While the Draft Plan has more short-term, construction-related impacts than the two alternatives, all of these impacts can be reduced to a less than significant level by provisions already included in the Draft Plan and mitigation measures recommended in this EIR. Because the Draft Plan would benefit the environment more than the two alternatives, it is deemed the environmentally superior alternative.

Form A

Notice of Completion & Environmental Document Transmittal

SCH # \_\_\_\_\_

Mail to: State Clearinghouse, PO Box 3044, Sacramento, CA 95812-3044 916/445-0613

Project Title: Mt. Tamalpais Watershed Road and Trail Management Plan

Lead Agency: Marin Municipal Water District

Contact Person: Mike Swozy

Mailing Address: 222 Nellen Avenue

Phone: 415-945-1190

City: Corte Madera

Zip: 94925

County: Marin

Project Location:

County: Marin

City/Nearest Community:

Mill Valley, Corte Madera, Larkspur, Ross, Kentfield, San Anselmo, Fairfax

Cross Streets: NA

Zip Code: \_\_\_\_\_

Total Acres: 18,600

Assessor's Parcel No. 170-120-01 and 21 more

Section: \_\_\_\_\_

Twp. \_\_\_\_\_

Range: \_\_\_\_\_

Base: \_\_\_\_\_

Within 2 Miles: State Hwy #: 1

Waterways: \_\_\_\_\_

Airports: \_\_\_\_\_

Railways: \_\_\_\_\_

Schools: \_\_\_\_\_

Document Type:

CEQA:

- NOP
- Early Cons
- Neg Dec
- Draft EIR

- Supplement/Subsequent EIR (Prior SCH No.) \_\_\_\_\_
- Other \_\_\_\_\_

NEPA:

- NOI
- EA
- Draft EIS
- FONSI

Other:

- Joint Document
- Final Document
- Other \_\_\_\_\_

Local Action Type:

- General Plan Update
- General Plan Amendment
- General Plan Element
- Community Plan
- Specific Plan
- Master Plan
- Planned Unit Development
- Site Plan
- Rezone
- Prezone
- Use Permit
- Land Division (Subdivision, etc.)
- Annexation
- Redevelopment
- Coastal Permit
- Other Management Plan

Development Type:

- Residential: Units \_\_\_\_\_ Acres \_\_\_\_\_
- Office: Sq.ft. \_\_\_\_\_ Acres \_\_\_\_\_ Employees \_\_\_\_\_
- Commercial: Sq.ft. \_\_\_\_\_ Acres \_\_\_\_\_ Employees \_\_\_\_\_
- Industrial: Sq.ft. \_\_\_\_\_ Acres \_\_\_\_\_ Employees \_\_\_\_\_
- Educational \_\_\_\_\_
- Recreational \_\_\_\_\_
- Water Facilities: Type \_\_\_\_\_ MGD \_\_\_\_\_
- Transportation: Type \_\_\_\_\_
- Mining: Mineral \_\_\_\_\_
- Power: Type \_\_\_\_\_ Watts \_\_\_\_\_
- Waste Treatment: Type \_\_\_\_\_
- Hazardous Waste: Type \_\_\_\_\_
- Other: Environmental Enhancement

Funding (approx.): Federal \$ \_\_\_\_\_ State \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

Project Issues Discussed in Document:

- Aesthetic/Visual
- Agricultural Land
- Air Quality
- Archeological/Historical
- Coastal Zone
- Drainage/Absorption
- Economic/Jobs
- Fiscal
- Flood Plain/Flooding
- Forest Land/Fire Hazard
- Geologic/Seismic
- Minerals
- Noise
- Population/Housing Balance
- Public Services/Facilities
- Recreation/Parks
- Schools/Universities
- Septic Systems
- Sewer Capacity
- Soil Erosion/Compaction/Grading
- Solid Waste
- Toxic/Hazardous
- Traffic/Circulation
- Vegetation
- Water Quality
- Water Supply/Groundwater
- Wetland/Riparian
- Wildlife
- Growth Inducing
- Landuse
- Cumulative Effects
- Other \_\_\_\_\_

Present Land Use/Zoning/General Plan Designation:

Project Description:

Identification, assessment, redesign and work plan for problematic sediment sources emanating from roads and trails on watershed land owned by Marin Municipal Water District.

January 2004

# Reviewing Agencies Checklist

Form A, continued

**KEY**

- S** = Document sent by lead agency
- X** = Document sent by SCH
- ✓** = Suggested distribution

- Resources Agency
- Boating & Waterways
- Coastal Commission
- Coastal Conservancy
- Colorado River Board
- Conservation
- Fish & Game
- Forestry & Fire Protection
- Office of Historic Preservation
- Parks & Recreation
- Reclamation Board
- S.F. Bay Conservation & Development Commission
- Water Resources (DWR)

**Business, Transportation & Housing**

- Aeronautics
- California Highway Patrol
- CALTRANS District # \_\_\_\_\_
- Department of Transportation Planning (headquarters)
- Housing & Community Development

**Food & Agriculture**

**Health & Welfare**

Health Services \_\_\_\_\_

**State & Consumer Services**

- General Services
- OLA (Schools)

**Environmental Protection Agency**

- Air Resources Board
- California Waste Management Board
- SWRCB: Clean Water Grants
- SWRCB: Delta Unit
- SWRCB: Water Quality
- SWRCB: Water Rights
- Regional WQCB # \_\_\_\_\_ ( \_\_\_\_\_ )

**Youth & Adult Corrections**

Corrections

**Independent Commissions & Offices**

- Energy Commission
- Native American Heritage Commission
- Public Utilities Commission
- Santa Monica Mountains Conservancy
- State Lands Commission
- Tahoe Regional Planning Agency

Other \_\_\_\_\_

**Public Review Period** (to be filled in by lead agency)

Starting Date August 6, 2004

Ending Date September 6, 2004

Signature Eric McQuire

Date August 3, 2004

**Lead Agency** (Complete if applicable):

Consulting Firm: Leonard Charles & Assoc  
 Address: 7 Robie Ct  
 City/State/Zip: San Anselmo, CA 94960  
 Contact: Leonard Charles  
 Phone: (415) 454-4575

**For SCH Use Only:**

Date Received at SCH \_\_\_\_\_  
 Date Review Starts \_\_\_\_\_  
 Date to Agencies \_\_\_\_\_  
 Date to SCH \_\_\_\_\_  
 Clearance Date \_\_\_\_\_

Notes:

**Applicant:** \_\_\_\_\_

Address: \_\_\_\_\_  
 City/State/Zip: \_\_\_\_\_  
 Phone: (\_\_\_\_) \_\_\_\_\_

California Home

Thurs



DPR Home > CEQAnet Home > CEQAnet Query > Search Results > Document Description

## Mt. Tamalpais Watershed Road and Trail Management Plan

SCH Number: 2004082018

Type: NOP

### Project Description

Identification, assessment, redesign and work plan for problematic sediment sources emanating from roads and trails on watershed land owned by Marin Munic

### Project Lead Agency

Marin Municipal Water District

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### Contact Information

#### Primary Contact:

Mike Swezy  
Marin Municipal Water District  
415-945-1190  
222 Nellen Avenue  
Corte Madera  
CA, 94925

---

### Project Location

County: Marin  
City: Corte Madera, Fairfax, Larkspur, Mill Valley, Ross, ...  
Region:  
Cross Streets:  
Parcel No: 170-120-01 and 21 more  
Township:  
Range:  
Section:  
Base:  
Other Location Info: City: Kentfield

---

### Proximity To

Highways: 1  
Airports:  
Railways:  
Waterways:  
Schools:  
Land Use:

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### Development Type

Other

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### Local Action

Other Action

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### Project Issues

Air Quality, Archaeologic-Historic, Noise, Soil Erosion/Compaction/Grading, Vegetation, Water Quality, Wildlife

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### Reviewing Agencies (Agencies in Bold Type submitted comment letters to the State Clearinghouse)

Resources Agency; Regional Water Quality Control Board, Region 2; Department of Parks and Recreation; Native American Heritage Commission; California C  
Department of Conservation; Department of Forestry and Fire Protection; Office of Historic Preservation; Department of Water Resources; Department of Fish

3; California Highway Patrol; Caltrans, District 4

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Date Received: 8/4/2004 Start of Review: 8/4/2004 End of Review: 9/2/2004

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Arnold  
Schwarzenegger  
Governor

STATE OF CALIFORNIA  
Governor's Office of Planning and Research  
State Clearinghouse and Planning Unit



Jan Boel  
Acting Director

**Notice of Preparation**

August 4, 2004

To: Reviewing Agencies

Re: Mt. Tamalpais Watershed Road and Trail Management Plan  
SCH# 2004082018

Attached for your review and comment is the Notice of Preparation (NOP) for the Mt. Tamalpais Watershed Road and Trail Management Plan draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

**Mike Swezy**  
**Marin Municipal Water District**  
**222 Nellen Avenue**  
**Corte Madera, CA 94925**

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan  
Project Analyst, State Clearinghouse

Attachments  
cc: Lead Agency



**Document Details Report  
State Clearinghouse Data Base**

**SCH#** 2004082018  
**Project Title** Mt. Tamalpais Watershed Road and Trail Management Plan  
**Lead Agency** Marin Municipal Water District

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**Type** NOP Notice of Preparation  
**Description** Identification, assessment, redesign and work plan for problematic sediment sources emanating from roads and trails on watershed land owned by Marin Municipal Water District.

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**Lead Agency Contact**

**Name** Mike Swezy  
**Agency** Marin Municipal Water District  
**Phone** 415-945-1190 **Fax**  
**email**  
**Address** 222 Nellen Avenue  
**City** Corte Madera **State** CA **Zip** 94925

---

**Project Location**

**County** Marin  
**City** Corte Madera, Fairfax, Larkspur, Mill Valley, Ross, ...  
**Region**  
**Cross Streets**  
**Parcel No.** 170-120-01 and 21 more  

<b>Township</b>	<b>Range</b>	<b>Section</b>	<b>Base</b>
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**Proximity to:**

**Highways** 1  
**Airports**  
**Railways**  
**Waterways**  
**Schools**  
**Land Use**

---

**Project Issues** Air Quality; Archaeologic-Historic; Noise; Soil Erosion/Compaction/Grading; Vegetation; Water Quality; Wildlife

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**Reviewing Agencies** Resources Agency; Regional Water Quality Control Board, Region 2; Department of Parks and Recreation; Native American Heritage Commission; California Coastal Commission; Department of Conservation; Department of Forestry and Fire Protection; Office of Historic Preservation; Department of Water Resources; Department of Fish and Game, Region 3; California Highway Patrol; Caltrans, District 4

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**Date Received** 08/04/2004 ; **Start of Review** 08/04/2004 **End of Review** 09/02/2004

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<input checked="" type="checkbox"/> <b>Resources Agency</b> Nadell Gayou	<input checked="" type="checkbox"/> <b>Dept. of Fish &amp; Game 3</b> Robert Floerke Region 3	<input type="checkbox"/> <b>Public Utilities Commission</b> Ken Lewis	<input type="checkbox"/> <b>Dept. of Transportation 8</b> John Pagano District 8	<input type="checkbox"/> <b>Regional Water Quality Control Board (RWQCB)</b>
<input checked="" type="checkbox"/> <b>Resources Agency</b> David Johnson	<input type="checkbox"/> <b>Dept. of Fish &amp; Game 4</b> William Laudermilk Region 4	<input type="checkbox"/> <b>State Lands Commission</b> Jean Sarino	<input type="checkbox"/> <b>Dept. of Transportation 9</b> Gayle Rosander District 9	<input type="checkbox"/> <b>RWQCB 1</b> Cathleen Hudson North Coast Region (1)
<input checked="" type="checkbox"/> <b>Dept. of Boating &amp; Waterways</b> California Coastal Commission Elizabeth A. Fuchs	<input type="checkbox"/> <b>Dept. of Fish &amp; Game 5</b> Don Chadwick Region 5, Habitat Conservation Program	<input type="checkbox"/> <b>Tahoe Regional Planning Agency (TRPA)</b> Cherry Jacques	<input type="checkbox"/> <b>Dept. of Transportation 10</b> Tom Dumas District 10	<input checked="" type="checkbox"/> <b>RWQCB 2</b> Environmental Document Coordinator San Francisco Bay Region (2)
<input type="checkbox"/> <b>Colorado River Board</b> Gerald R. Zimmerman	<input type="checkbox"/> <b>Dept. of Fish &amp; Game 6</b> Gabrina Gatchel Region 6, Habitat Conservation Program	<input type="checkbox"/> <b>Business, Trans &amp; Housing</b>	<input type="checkbox"/> <b>Dept. of Transportation 11</b> Mario Orso District 11	<input type="checkbox"/> <b>RWQCB 3</b> Central Coast Region (3)
<input checked="" type="checkbox"/> <b>Dept. of Conservation</b> Roseanne Taylor	<input type="checkbox"/> <b>Dept. of Fish &amp; Game 6 I/M</b> Tammy Allen Region 6, Inyo/Mono, Habitat Conservation Program	<input type="checkbox"/> <b>Caltrans - Division of Aeronautics</b> Sandy Hesnard	<input type="checkbox"/> <b>Dept. of Transportation 12</b> Bob Joseph District 12	<input type="checkbox"/> <b>RWQCB 4</b> Jonathan Bishop Los Angeles Region (4)
<input type="checkbox"/> <b>California Energy Commission</b> Environmental Office	<input type="checkbox"/> <b>Dept. of Fish &amp; Game M</b> George Isaac Marine Region	<input type="checkbox"/> <b>California Highway Patrol</b> John Olejnik Office of Special Projects	<input type="checkbox"/> <b>CalEPA</b>	<input type="checkbox"/> <b>RWQCB 5S</b> Central Valley Region (5)
<input checked="" type="checkbox"/> <b>Dept. of Forestry &amp; Fire Protection</b> Allen Robertson	<input type="checkbox"/> <b>Other Departments</b>	<input type="checkbox"/> <b>Housing &amp; Community Development</b> Lisa Nichols Housing Policy Division	<input type="checkbox"/> <b>Air Resources Board</b>	<input type="checkbox"/> <b>RWQCB 5F</b> Central Valley Region (5) Fresno Branch Office
<input checked="" type="checkbox"/> <b>Office of Historic Preservation</b> Wayne Donaldson	<input type="checkbox"/> <b>Food &amp; Agriculture</b> Steve Shaffer	<input type="checkbox"/> <b>Dept. of Transportation</b>	<input type="checkbox"/> <b>Transportation Projects</b> Kurt Karperos	<input type="checkbox"/> <b>RWQCB 5R</b> Central Valley Region (5) Redding Branch Office
<input checked="" type="checkbox"/> <b>Dept. of Parks &amp; Recreation</b> B. Noah Tilghman Environmental Stewardship Section	<input type="checkbox"/> <b>Dept. of Food and Agriculture</b>	<input type="checkbox"/> <b>Dept. of Transportation 1</b> Mike Eagan District 1	<input type="checkbox"/> <b>Industrial Projects</b> Mike Tollstrup	<input type="checkbox"/> <b>RWQCB 6</b> Lahontan Region (6)
<input type="checkbox"/> <b>Reclamation Board</b> DeeDee Jones	<input type="checkbox"/> <b>Dept. of General Services</b> Robert Sleppy Environmental Services Section	<input type="checkbox"/> <b>Dept. of Transportation 2</b> Don Anderson District 2	<input type="checkbox"/> <b>California Integrated Waste Management Board</b> Sue O'Leary	<input type="checkbox"/> <b>RWQCB 6V</b> Lahontan Region (6) Victorville Branch Office
<input type="checkbox"/> <b>Santa Monica Mountains Conservancy</b> Paul Edelman	<input type="checkbox"/> <b>Dept. of Health Services</b> Wayne Hubbard Dept. of Health/Drinking Water	<input type="checkbox"/> <b>Dept. of Transportation 3</b> Jeff Pulverman District 3	<input type="checkbox"/> <b>State Water Resources Control Board</b> Jim Hockenberry Division of Financial Assistance	<input type="checkbox"/> <b>RWQCB 7</b> Colorado River Basin Region (7)
<input type="checkbox"/> <b>S.F. Bay Conservation &amp; Dev't. Comm.</b> Steve McAdam	<input type="checkbox"/> <b>Independent Commissions, Boards</b>	<input type="checkbox"/> <b>Dept. of Transportation 4</b> Tim Sable District 4	<input type="checkbox"/> <b>State Water Resources Control Board</b> Steven Herrera Division of Water Rights	<input type="checkbox"/> <b>RWQCB 8</b> Santa Ana Region (8)
<input checked="" type="checkbox"/> <b>Dept. of Water Resources</b> Resources Agency Nadell Gayou	<input type="checkbox"/> <b>Delta Protection Commission</b> Debbie Eddy	<input type="checkbox"/> <b>Dept. of Transportation 5</b> David Murray District 5	<input type="checkbox"/> <b>State Water Resources Control Board</b> CEQA Tracking Center	<input type="checkbox"/> <b>RWQCB 9</b> San Diego Region (9)
<input type="checkbox"/> <b>Fish and Game</b>	<input type="checkbox"/> <b>Office of Emergency Services</b> Dennis Castrillo	<input type="checkbox"/> <b>Dept. of Transportation 6</b> Marc Bimbaum District 6	<input type="checkbox"/> <b>Other</b>	
<input type="checkbox"/> <b>Dept. of Fish &amp; Game</b> Scott Flint Environmental Services Division	<input type="checkbox"/> <b>Governor's Office of Planning &amp; Research</b> State Clearinghouse	<input type="checkbox"/> <b>Dept. of Transportation 7</b> Cheryl J. Powell District 7		
<input type="checkbox"/> <b>Dept. of Fish &amp; Game 1</b> Donald Koch Region 1	<input type="checkbox"/> <b>Native American Heritage Comm.</b> Debbie Treadway			
<input type="checkbox"/> <b>Dept. of Fish &amp; Game 2</b> Banky Curtis Region 2				



DEPARTMENT OF FISH AND GAME

<http://www.dfg.ca.gov>

POST OFFICE BOX 47  
YOUNTVILLE, CALIFORNIA 94599  
(707) 944-5500



August 9, 2004

Mr. Mike Swezy  
Marin Municipal Water District  
222 Nellen Avenue  
Corte Madera, CA 94925

Dear Mr. Swezy:

Mt. Tamalpais Watershed Road  
And Trail Management Plan  
SCH 2004082018

The Department of Fish and Game (DFG) has reviewed the document for the subject project. Please be advised this project may result in changes to fish and wildlife resources as described in the California Code of Regulations, Title 14, Section 753.5(d)(1)(A)-(G)<sup>1</sup>. Therefore, if you are preparing an Initial Study and Negative Declaration for this project, a de minimis determination is not appropriate, and an environmental filing fee as required under Fish and Game Code Section 711.4(d) should be paid to the Marin County Clerk on or before filing of the Notice of Determination for this project.

A complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats, should be provided. Rare, threatened and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, Section 15380). The assessment should identify any rare plants and rare natural communities, following DFG's Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities (revised May 8, 2000). The Guidelines are available at [www.dfg.ca.gov/whdab/pdfs/guideplnt.pdf](http://www.dfg.ca.gov/whdab/pdfs/guideplnt.pdf)

<sup>1</sup> <http://ccr.oal.ca.gov/>. Find California Code of Regulations, Title 14 Natural Resources, Division 1, Section 753

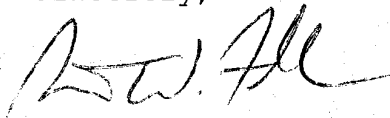
Mr. Mike Swezy  
August 9, 2004  
Page 2

Please be advised that a California Endangered Species Act (CESA) Permit must be obtained if the project has the potential to result in take of species of plants or animals listed under CESA, either during construction or over the life of the project. Issuance of a CESA Permit is subject to CEQA documentation; therefore, the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the project will impact CESA listed species, early consultation is encouraged, as significant modification to the project and mitigation measures may be required in order to obtain a CESA Permit.

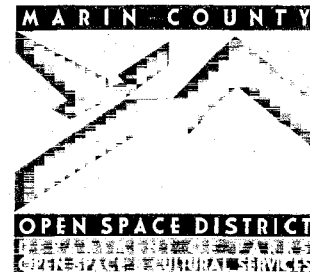
For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, DFG may require a Streambed Alteration Agreement (SAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of SAAs is subject to CEQA. DFG, as a responsible agency under CEQA, will consider the local jurisdiction's (lead agency) Negative Declaration or Environmental Impact Report for the project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for completion of the agreement. To obtain information about the SAA notification process, please access our website at [www.dfg.ca.gov/1600](http://www.dfg.ca.gov/1600); or to request a notification package, contact the Streambed Alteration Program at (707) 944-5520.

If you have any questions, please contact Mr. Liam Davis, Environmental Scientist, at (707) 944-5529; or Mr. Scott Wilson, Habitat Conservation Supervisor, at (707) 944-5584.

Sincerely,



Robert W. Floerke  
Regional Manager  
Central Coast Region



Marin County  
Department of Parks,  
Open Space and  
Cultural Services

September 10, 2004

Mike Swezy  
Marin Municipal Water District  
220 Nellen Avenue  
Corte Madera, CA 94925-1169

RE: Mount Tamalpais Watershed Road and Trail Management Plan

Dear Mr. Swezy:

Thank you for the opportunity to comment on the Notice of Intent (NOI) to prepare a Programmatic Environmental Impact Report (PEIR) for the above-referenced plan. Generally, the Marin County Open Space District (District) agrees with the issues covered in the NOI. In addition to those issues, however, the District believes that the PEIR should address the effect of the plan on the public use of adjacent recreation and open space land. Specifically, there may be an effect on trail use on adjacent property when the Water District (MMWD) changes the designation of a trail from system to non-system trails or vice versa. There may also be an effect on trail use on adjacent land when the MMWD decommissions a trail. Finally, the District believes that the PEIR should consider the effect of the plan on use and management of trails that MMWD and the District jointly manage, such as the ridge top trail that is the border between the Gary Giacomini Open Space Preserve and the Mount Tamalpais Watershed in the San Geronimo Valley area.

Once again, thank you for the opportunity to comment. If you have any questions, you can call me at (415) 499-3745.

Sincerely

A handwritten signature in black ink that reads "James R. Raives". The signature is written in a cursive style with a large initial "J".

James R. Raives  
Senior Open Space Planner

- c. David Hansen, Planning and Acquisition Manager  
Chris Bramham, Open Space Superintendent

Ronald Miska, Assistant General Manager  
415.499.6387

Chris Bramham, Open Space Superintendent  
415.499.6405

# **INITIAL STUDY**

# **MT. TAMALPAIS WATERSHED ROAD AND TRAIL MANAGEMENT PLAN**

**June 2004**

**Prepared for: Marin Municipal Water District  
220 Nellen Avenue  
Corte Madera, California 94925**

**Prepared by: Leonard Charles and Associates  
7 Roble Court  
San Anselmo, California 94960  
415-454-4575**

## **TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Page</u></b>
1. Introduction and Background	1
2. Project Location and Setting	1
3. Purpose of the Proposed Project	2
4. Proposed Project Description	3
5. Lead Agency	11
6. Other Permits and Regulatory Oversight	11
7. Related Projects	12
8. Initial Study Checklist	13
9. Bibliography and Persons Contacted	55
10. Report Preparation	56

## **TABLE OF FIGURES**

<b><u>Section</u></b>	<b><u>Following Page</u></b>
1. Regional Location Map	1
2. Watershed Map	1
3. Characteristics of Storm-Proofed Roads	4

## **TABLE OF TABLES**

1. Erosion Sources for Sub-Watersheds	9
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## 1.0 INTRODUCTION AND BACKGROUND

This Initial Study has been prepared in accordance with the California Environmental Quality Act (CEQA), Public Resources Code 21000 *et seq.* and the *State CEQA Guidelines*, California Code of Regulations Section 15000 *et seq.*

Marin Municipal Water District (MMWD) proposes to adopt and implement the *Draft Mt. Tamalpais Watershed Road and Trail Management Plan* (Draft Plan). The Draft Plan identifies specific improvements for roads and trails on the Mt. Tamalpais Watershed (the Watershed) to reduce erosion from those roads and trails. The Draft Plan identifies Best Management Practices to be used when conducting the erosion control projects and for future management of the roads and trails. The Draft Plan also contains an inventory of all roads and trails and makes recommendations about accepting certain roads and trails as official roads and trails, reclassifying other roads and trails, and closing or decommissioning certain roads and trails.

MMWD, as Lead Agency, has determined that a Program Environmental Impact Report (PEIR) will be prepared for this proposed project. This Initial Study has two aims. First, it will identify which environmental resources would not be affected by the project, affected at a less than significant level, or significantly affected but standard mitigation measures included in the Initial Study would reduce the impact to a less than significant level. Supporting data will be provided to demonstrate how the conclusion of "no impact," "less than significant impact," and "less than significant with mitigation incorporated" was reached. Second, the Initial Study will identify the remaining areas where the project may have a significant impact. These are the resources and areas of impact that will be addressed in the PEIR. Thus, the Initial Study "focuses" the analyses to be included in the PEIR.

## 2.0 PROJECT LOCATION AND SETTING

The Mount Tamalpais Watershed is located in central Marin County and covers nearly 19,000 acres (see Figures 1 and 2). It is adjacent to other large open space and recreational lands including the Golden Gate National Recreation Area (GGNRA), Point Reyes National Seashore, Muir Woods National Monument, Samuel P. Taylor State Park, Mount Tamalpais State Park, several Marin County Open Space Preserves, and numerous other local city and county park lands. These parklands comprise over 150,000 acres of contiguous protected public lands in Western Marin County. The many creeks that have their headwaters in the Watershed flow either into San Francisco Bay, Tomales Bay, or directly into the Pacific Ocean.

The Mt. Tamalpais Watershed consists of the drainage areas for five reservoirs including the entire upper watershed of Lagunitas Creek and Mount Tamalpais itself. It also includes lands just outside or adjacent to the communities of Lagunitas, Forest Knolls, San Geronimo, Woodacre, Fairfax, San Anselmo, Ross, Kentfield, Larkspur, Corte Madera, and Mill Valley (see Figure 2).

The Watershed lies within the Mediterranean climate region of California that consists of wet, mild winters and warm, dry summers. Elevation ranges from 80 feet to 2,571 feet. Topography



is characterized by “V”-shaped valleys located between narrow ridge crests, though there are areas with more gently rolling hills, primarily around Bon Tempe Lake and Alpine Lake. The Watershed supports a rich variety of vegetation communities, ranging from grasslands to chaparral, oak woodland, and redwood forests. These communities provide habitat for a wide range of wildlife, including a number of unique (or special-status) species of plants and animal.

Besides providing a watershed for the collection of public water and an important natural area, the Watershed serves as a valuable scenic and recreational open space resource. Hikers, horseback riders, joggers, bicyclists, fisherpeople, picnickers, birders, naturalists and other visitors frequently use the area.

The primary entrances to the Watershed are mainly through neighboring communities, notably Deer Park and Sky Oaks (Fairfax), Natalie Coffin Green Park (Ross), and Throckmorton Ridge and Old Railroad Grade (Mill Valley). There are numerous other well used entrances off of Bolinas-Fairfax Road, Panoramic Highway, and Ridgecrest Boulevard. While residents from neighboring communities regularly use the Watershed lands, visitors come from the greater San Francisco Bay Area, other parts of the United States, and other countries, owing to its proximity to the world-renowned Muir Woods National Monument, the Golden Gate National Recreation Area, and Point Reyes National Seashore.

### **3.0 PURPOSE OF THE PROPOSED PROJECT**

Roads and trails have a number of undesirable effects on the environment. They are the greatest human-caused source of sediment to streams and reservoirs on the Watershed. Other ecological impacts from roads and trails include fragmenting or displacing biological habitat, providing places for unwanted, invasive weeds to expand, and increasing wildlife mortality.

The primary goals and objectives of the Draft Plan are to protect water quality and to devise management practices for the roads and trails. More specifically, the goals are:

- To improve water quality and minimize sediment inputs to the streams and reservoirs;
- To reduce the impact of the road and trail network on wetlands, riparian areas, other environmentally sensitive habitats, and plant and animal species that are listed as threatened or endangered; and
- To reduce the impact of the road and trail network on the Watershed’s natural ecological functions.

The objectives of the plan are:

- To make decisions regarding the existing road and trail network (i.e. inventory and categorize the roads and trails and identify which of them the District should officially recognize as system roads and trails);
- To implement Best Management Practices (BMPs) and Environmental Protection Measures in the upgrade and maintenance of the roads and trails in the Watershed; and
- To devise a system for managing all the roads and trails on the Watershed.

## 4.0 PROPOSED PROJECT DESCRIPTION

The *Draft Mt. Tamalpais Watershed Road and Trail Management Plan* contains five elements. The main element addresses specific erosion problems affecting Watershed streams and identifies road and trail projects needed to control this erosion. The Draft Plan includes an inventory of all trails and roads on the Watershed and makes decisions about which roads and trails will be part of MMWD's official road and trail system, which trails and roads should be reclassified to a different type of trail or road, and which trails and roads should be decommissioned due to environmental degradation and/or redundancy. A third element contains best management practices, design standards, and environmental protection measures. A fourth element identifies a work plan for managing non-system roads and trails (i.e., roads and trails that are not part of the official MMWD road and trail system). The final element describes how the plan would be implemented and monitored. Each of these elements is described in more detail below.

The District plans to implement the highest priority sediment reduction strategies within 5 years, subject to available resources. The remainder of the strategies would be implemented over the next 10 to 15 years. The full implementation of all the strategies should be completed in 20 years. At any time during this period this plan could be reviewed and amended as necessary based on lessons learned from the actual plan implementation.

### A. Erosion Control

The erosion control portions of the Draft Plan are based on the recommendations set forth in the *Road and Trail Erosion Inventory and Assessment, Erosion Prevention Implementation Plan, Mt. Tamalpais Watershed, Marin Municipal Water District, Marin County, California* (prepared for MMWD by Pacific Watershed Associates, October 2003). The aim is to eliminate major erosion sources and to "storm-proof" the road and trail system to minimize future erosion. The Plan includes the following figure (Figure 3) that defines "storm-proofed" roads.

The Draft Plan identifies approximately 970 sites on the Watershed that need some form of treatment to eliminate or reduce erosion which would result in sedimentation of streams or reservoirs. Inventoried sediment delivery sites generally fall into one of several categories: road or trail stream crossings, potential and existing landslides related to the road or trail system, gullies below ditch relief culverts and other runoff outfalls, and long sections of uncontrolled road or trail surface and ditch runoff that currently discharge to the stream system. The types of treatments include road and trail upgrading, stream crossing improvements, cut and fill slope stabilization, and road or trail decommissioning. The following summarizes erosion areas and the types of treatment.

### FIGURE 3

#### CHARACTERISTICS OF STORM-PROOFED ROADS

The following abbreviated criteria identify common characteristics of “storm-proofed” roads. Roads are “storm-proofed” when sediment delivery to streams is strictly minimized. This is accomplished by dispersing road surface drainage, preventing road erosion from entering streams, protecting stream crossings from failure or diversion, and preventing failure of unstable fills which would otherwise deliver sediment to a stream. Minor exceptions to these “guidelines” can occur at specific sites within a forest or ranch road system.

##### ***STREAM CROSSINGS***

- all stream crossings have a drainage structure designed for the 100-year flow
- stream crossings have no diversion potential (functional critical dips are in place)
- stream crossing inlets have low plug potential (trash barriers & graded drainage)
- stream crossing outlets are protected from erosion (extended, transported or dissipated)
- culvert inlet, outlet and bottom are open and in sound condition
- undersized culverts in deep fills (> backhoe reach) have emergency overflow culvert
- bridges have stable, non-eroding abutments & do not significantly restrict design flood
- fills are stable (unstable fills are removed or stabilized)
- road surfaces and ditches are “disconnected” from streams and stream crossing culverts
- decommissioned roads have all stream crossings completely excavated to original grade
- Class 1 (fish) streams accommodate fish passage

##### ***ROAD AND LANDING FILLS***

- unstable and potentially unstable road and landing fills are excavated (removed)
- excavated spoil is placed in locations where eroded material will not enter a stream
- excavated spoil is placed where it will not cause a slope failure or landslide

##### ***ROAD SURFACE DRAINAGE***

- road surfaces and ditches are “disconnected” from streams and stream crossing culverts
- ditches are drained frequently by functional rolling dips or ditch relief culverts
- outflow from ditch relief culverts does not discharge to streams
- gullies (including those below ditch relief culverts) are dewatered to the extent possible
- ditches do not discharge (through culverts or rolling dips) onto active or potential landslides
- decommissioned roads have permanent road surface drainage and do not rely on ditches

## **1. Stream Crossings**

The Draft Plan identifies 372 road-related erosion sites at stream crossings. These crossings include 305 crossings that have culverts, 56 unculverted fill crossings (an unculverted fill crossing refers to a stream crossing that has no constructed drainage structure to carry streamflow through the road prism), 6 ford crossings, and 3 bridges. An additional 401 stream crossings were inventoried on trails. Eighteen (18) of these crossings on trails were classified as culverted crossings, 108 as fill crossings, 183 as ford crossings, and 79 as bridge crossings. Approximately 83,506 cubic yards of future road-related sediment could possibly be delivered to creeks or reservoirs from erosion at stream crossings, if the crossings were to wash out. An additional, approximately 1,456 cubic yards of sediment could possibly be delivered from the trail-related sites.

Three road design conditions indicate a high potential for future erosion at stream crossings. These include 1) undersized culverts (the culvert is too small for the 100-year design storm flow), 2) culverts that are prone to plugging with sediment or organic debris, and 3) stream crossings with a diversion potential (i.e., the stream overtops the crossing during a storm and flows down the road or trail). The worst scenario is for a culvert to plug and the stream crossing to wash out or the stream to divert down the road in a major storm. Not all these crossings can be expected to wash out, but over time, many will experience repeated episodes of partial erosion, stream diversion, or complete failure. The rate of failure will be higher for crossings which are abandoned or for those which are not designed to current standards. The biggest problems can be expected during the peak storm events when District resources may be insufficient or not available on a continuous basis to maintain or clear all the culverts during the same storm.

Of the identified stream crossing locations, 360 (97%) of the road-related sites and 206 (51%) of the trail-related sites will need some level of upgrade for the roads and trail network to be “storm proofed.” Preventive treatments include such measures as constructing critical dips (rolling dips) at stream crossings to prevent stream diversions onto the road surface, installing larger culverts at locations where current pipes are under-designed for the 100-year storm flow (or where they are prone to plugging), installing culverts at the natural channel gradient to maximize the sediment transport efficiency of the pipe and ensure that the culvert outlet will discharge on the natural channel bed below the base of the road fill, installing debris barriers and flared culvert inlets to prevent culvert plugging, and installing culvert downspouts to prevent outlet erosion.

## **2. Landslides**

Only those landslide sites with a potential for sediment delivery to a stream channel were inventoried. Forty-one (41) potential road-related landslides and 11 trail-related landslides were identified. Most of the potential landslide sites were found along roads where material had been sidcast during earlier construction and now show signs of instability. Potential road-related landslides are expected to deliver about 5,013 cubic yards of sediment to streams on the Watershed in the future; trail-related landslides would add about 161 cubic yards.

Forty (98%) of the road landslides and 8 (73%) of the trail landslides will need some level of upgrade for the roads and trail network to be “storm proofed.” Preventative treatment basically involves physical excavation of the sidcast materials and proper disposal of excess materials.

In a few cases, when a minimum road width needs to be maintained, a retaining wall, crib wall or other engineered structure is necessary

### **3. Ditch Relief Culverts**

Only those ditch relief culverts that currently deliver or will potentially deliver sediment to streams in the future were inventoried for the Draft Plan. One hundred fifty-six (156) ditch relief culverts on road with potential sediment delivery were identified. Gully erosion can occur below ditch relief culvert outlets due to excessive road and/or ditch contribution to the inlet. Gully erosion can also occur as a result of poor installation techniques such as shotgunned outlets (i.e., culverts that stick out in the air above the slope) or the culvert being placed too high in the fill without functional downspouts. Of the 156 ditch relief culverts identified, 150 have been recommended for treatment. These sites are expected to deliver approximately 2,067 cubic yards of sediment to streams and lakes on the Watershed if they remain untreated in the future. Correcting or reducing sediment delivery associated with ditch relief culverts generally involves dispersing excessive ditch flow by installing additional ditch relief culverts, installing rolling dips, and outsloping roads. Reducing outlet erosion below these sites involves installing functional downspouts as well as replacing ditch relief culverts deeper in the fill.

### **4. "Other" Sites**

Approximately 3,427 cubic yards of sediment could be delivered to streams in the next 20 years from 187 "other" road-related erosion sites. Approximately 306 cubic yards could possibly be delivered from 50 "other" trail-related sites. The "other" erosion types are gully expansion along roads, bank erosion of roads and trails that impinge on streams, road or trail rilling, and the interaction of springs with roads and trails. Some level of upgrade is recommended for 180 (96%) of the road-related sites and 44 (88%) of the trail-related sites.

### **5. Persistent Erosion**

Actively used roads and trails generate a chronic, or persistent, type of erosion and source of sediment. Causes of persistent erosion include: (1) pulverizing and wearing down of the surface by vehicles, horses, bicycles or foot traffic; (2) cutbank erosion (due to natural causes and maintenance activities), (3) inboard ditch erosion (due to natural causes and maintenance activities), and (4) wet weather erosion on the roads and trails. When concentrated runoff runs down a length of unpaved road or trail, it becomes a sediment problem. The longer the uninterrupted length, the more of a problem it becomes.

In the Watershed, 51.4 miles of road were identified that deliver sediment directly to a creek or reservoir or one of their tributaries. These road and trail segments are said to be "hydraulically connected" to the creek channel network. An additional 14.5 miles of hydraulically connected trails were identified on the Watershed. About 50.6 miles (98%) of the hydraulically connected roads and 12.5 miles (86%) of the hydraulically connected trails will need some level of upgrade before they are "storm proofed." The road or trail segments not recommended for treatment will be fixed once the erosion problems at adjacent sites are fixed. Approximately 87,911 cubic yards of road-related sediment could be delivered to the creeks or reservoirs from persistent erosion over the next 20 years if no efforts were made to change road drainage patterns. An additional, approximately 3,904 cubic yards of sediment could be delivered from the trails.

Relatively straightforward erosion prevention treatments can be applied to upgrade road and trail systems to prevent fine sediment from entering stream channels. Road upgrading involves a variety of treatments used to make a road more resilient to large storms and flood flows. The most important of these include stream crossing upgrades (especially increasing culvert sizes to accommodate the 100-year storm flow, and to eliminate stream diversion potential), removal of unstable sidecast and fill materials from steep slopes, and the application of drainage techniques to improve dispersion of road surface runoff. Road drainage techniques include berm removal, road outsloping, rolling dip construction, and/or the installation of ditch relief culverts. The goal of all treatments is to disperse road runoff and make the road as “hydrologically invisible” as is possible.

Some roads will need to be re-rocked after upgrade of a stream crossing, installation of ditch relief culverts, rolling dip construction and road outsloping or insloping are completed.

## **6. Road and Trail Decommissioning**

The Draft Plan contains a full description of the methods to be used for decommissioning certain roads and trails (see Subsection C below for a summary of trails and roads scheduled for decommissioning). In order to protect the aquatic ecosystem, the goal is to “hydrologically” decommission the road, that is, to minimize the effect of the road on natural hillslope and watershed runoff. From least intensive to most intensive, decommissioning work will include at least some of the following tasks:

1. Road ripping or decompaction, in which the surface of the road is "decompacted" using mechanical rippers (usually ripping teeth mounted on the back of a bulldozer). This action reduces surface runoff and often dramatically increases revegetation rates.
2. Waterbars and cross-road drains are installed at 50, 75, 100, or 200-foot intervals, or as necessary at springs and seeps, to disperse road surface runoff. Cross-road drains are large ditches or trenches excavated across a road surface to provide drainage and to prevent the collection of concentrated runoff on the former road bed. They are typically deeper than waterbars and do not allow for vehicle access.
3. In-place stream crossing excavation is a decommissioning treatment that is employed at locations where roads were built across stream channels. The fill (including the culvert) is completely excavated and the original streambed and sideslopes are exhumed (uncovered). Excavated spoil is stored at nearby stable locations where it will not erode. A stream crossing excavation typically involves more than simply removing the culvert, as the underlying and adjacent fill material must also be removed and stabilized.
4. Exported stream crossing excavation is a decommissioning treatment where stream crossing fill material is excavated and spoil is hauled off-site for storage. Spoil is moved farther up- or down-road from the crossing, due to the limited amount of stable storage locations at the excavation site. This treatment frequently requires dump trucks to end-haul spoil material to the off-site location.

5. In-place outsloping ("pulling the sidecast") calls for excavation of unstable or potentially unstable sidecast material along the outside edge of a road prism or landing and replacement of the spoil on the roadbed against the adjacent cutbank, or within several hundred feet of the excavation site. Placement of the spoil material against the cutbank usually blocks access to the road and is used in road decommissioning.
6. Exported outsloping is comparable to in-place outsloping, except spoil material is moved off-site to a permanent, stable storage location. Where the road prism is very narrow, where there are springs along the road cutbank, or where continued use of the road is anticipated, spoil material is typically not placed against the cutbank and material is end-hauled to a spoil disposal site. This treatment frequently requires dump trucks to end-haul spoil material. This is typically a decommissioning treatment as part or all of the roadbed is removed.

Only in relatively few instances does road decommissioning have to include full recontouring of the original road bed. Typically, potential problem areas along a road are isolated to a few locations (perhaps 10% to 20% of the road to be decommissioned) where stream crossings need to be excavated, unstable landing and road sidecast fill needs to be removed before it fails, or roads cross potentially unstable terrain and the entire prism needs to be removed. Most of the remaining road surface simply needs permanently improved surface drainage, using decompaction, road drains, and/or partial outsloping. While complete decommissioning may not be needed to attain sediment reduction goals, MMWD may construct more extensive decommissioning to dissuade use of the road or trail and/or to return the site to a more natural state. The road surface should receive revegetation treatments in locations where eroded sediment could be delivered to a stream (such as the sideslopes to excavated stream crossings), but in the cool coastal setting, much of the decommissioned alignment can be left to naturally revegetate from nearby seed sources. Trail decommissioning uses similar techniques but requires much less effort.

## **7. Summary**

Future erosion from inventoried road and trail locations is predicted to deliver about 186,305 cubic yards of sediment (about 179,500 cubic yards from roads and 6,805 cubic yards from trails) to area streams over the next twenty years. Implementation of the projects in the Draft Plan would potentially reduce sedimentation by up to that amount.

**TABLE 1****EROSION SOURCES FOR SUB-WATERSHEDS**

Sub-Watershed	Acres	Volume from Road Erosion (cu.yds.)	Volume from Trail Erosion (cu.yds.)	Total Erosion (cu.yds.)	Erosion per Acre
Alpine Lake	4,559	39,072	1,591	40,174	8.9
Kent Lake	7,341	36,140	1,026	36,700	5.0
Phoenix Lake	1,371	26,049	1,014	26,724	19.5
Redwood Creek	963	24,300	1,526	25,110	26.1
Arroyo Corte Madera	334	15,965	301	16,136	48.3
Old Mill Creek	410	12,645	41	12,666	30.9
Lagunitas Creek	605	8,702	0	8,702	14.4
Lake Lagunitas	1,135	5,200	352	5,405	4.8
Deer Park	606	3,723	510	3,989	6.6
Bon Tempe Lake	651	3,111	232	3,282	5.0
Cascade Canyon	874	2,597	212	2,741	3.1
Ross Creek	99	1,037	0	1,037	10.5
Larkspur Creek	41	959	0	959	23.4
<b>TOTALS</b>	<b>18,989 acres</b>	<b>179,500 cu.yds.</b>	<b>6,805 cu.yds.</b>	<b>186,305 cu.yds.</b>	<b>9.8 cu.yds. per acre</b>

**B. Best Management Practices, Design Standards, and Environmental Protection Measures**

The Draft Plan contains a chapter devoted to describing the Best Management Practices (BMPs), Design Standards, and Environmental Protection Measures that MMWD and its contractors will use when constructing the various Draft Plan projects. This include discrete BMPs for the installation of road and trail surface drainage improvements and hillside drainage, culverts, and stream crossings. Design standards are provided for trail siting and location in the few locations where the Draft Plan recommends rerouting of an existing trail. The Environmental Protection Measures include measures to:

- Protect creeks;



- Minimize disturbance and confine work to areas already disturbed, as feasible;
- Provide temporary erosion control;
- Retain and reuse topsoil;
- Control invasive plants;
- Road maintenance ( e.g. seasonal closures, inspections, minimizing road grading, ditch and culvert maintenance, etc.);
- Prevent sidecasting of material where it could end up in creeks;
- Removal of creek crossings and unstable fillslopes where decommissioning a road; and
- Revegetation

### **C. Road and Trail System**

MMWD intends to manage its roads and trails in a way that minimizes stream sedimentation and other undesirable environmental impacts. All of the approximately 100 miles of roads and 110 miles of trails identified in the field inventory were evaluated based on their effects on water quality, habitat, patrol and maintenance costs, and route connectivity or redundancy. Based on this review, the Draft Plan recommends the following:

- Four (4) system roads will be converted to "small vehicle roads" (i.e., roads capable of allowing access by all-terrain vehicles but not full-size trucks or cars);
- Three (3) system roads will be converted to some type of trail;
- One (1) unpaved system road will be paved;
- Three (3) system roads will be converted to trails and rerouted and 3 system trails will be rerouted;
- All or parts of 7 system roads and 4 trails will be decommissioned; and
- Eleven (11) non-system trails will be adopted as part of the official road and trail system.

### **D. Non-System Routes**

As described above, 11 non-system trails will be adopted as part of the official trail system. Specific erosion reduction projects are recommended for non-system trails that are generating significant erosion. Other non-system trails will be monitored to determine whether their use is causing erosion or other environmental harm. As warranted, MMWD will implement responses ranging from minor efforts to close the trail (e.g., covering the access with branches or logs) to signing, installation of barriers, full restoration of the trail, and aggressive patrolling. The Plan includes methods of educating the public and user groups about the plan and the trail and road system, enforcement strategies, and a discussion of the ability to close areas where necessary.

### **E. Implementation and Monitoring**

Projects included in the Draft Plan will be scheduled in a 5-year schedule that will be annually updated. The public will be notified about the plan and upcoming projects. The Plan will be

annually reviewed and modified, if warranted. Plan amendment will be done in conformity with District Watershed management policy, laws and regulations governing the District, general provisions of this Plan, and all other applicable state and federal laws. Any proposed amendment will occur only after a public hearing(s), required environmental review, and Board approval (for substantial amendments).

## **5.0 LEAD AGENCY**

### **1. Project Title**

Mt. Tamalpais Watershed Road and Trail Management Plan

### **2. Lead Agency Name and Address**

Marin Municipal Water District  
220 Nellen Avenue  
Corte Madera, CA 94925

### **3. Contact Person and Phone Number**

Mr. Mike Swezy  
Marin Municipal Water District  
220 Nellen Avenue  
Corte Madera, CA 94925  
415.945.1181 ext. 3 and then 1

## **6.0 OTHER PERMITS AND REGULATORY OVERSIGHT**

The Marin Municipal Water District (MMWD) is the public agency responsible for approving and carrying out the proposed project and is considered the Lead Agency under CEQA. MMWD is responsible for preparing this Initial Study. MMWD will approve the Program Environmental Impact Report (PEIR) that will be prepared for the proposed plan and either approve or reject the plan or approve an amended plan after the PEIR has been circulated for public review and comment.

While the Draft Plan itself does not need approvals or permits from any other agencies, actions proposed in the Draft Plan will require permits from several agencies, including

- The U.S. Army Corps of Engineers (the Corps) will need to approve a permit(s) to allow "filling" of wetlands and "Waters of the U.S." under the Corps' jurisdiction. It is possible that individual permits or permitting under approved Nationwide Permits might be required. However, preliminary discussions with the Corps indicate that the Corps might prefer to approve one Regional General Permit (RGP) to cover all future actions that are included in the Draft Plan. As part of the permitting process, the Corps would consult with the U.S. Fish

and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration – Fisheries Section (NOAA-Fisheries) to ensure their concerns and conditions (as established in the required Biological Opinion) are included.

- Some work would be done within the banks of streams. This work would require notification of the California Department of Fish and Game (CDFG) under Section 1602 of the California Fish and Game Code and would require a Section 1603 Streambed Alteration Agreement from the CDFG. Preliminary discussions with CDFG indicate that CDFG may also issue one Streambed Alteration Agreement to cover all future projects identified in the Draft Plan.
- The Regional Water Quality Control Board (San Francisco Bay Region) would need to provide Water Quality Certification for the Army Corps permit.

## **7.0 RELATED PROJECTS**

Other projects planned or proposed on the Watershed or in the area that might combine with actions proposed in the Draft Plan to result in cumulative impacts include;

- The Marin County Open Space District (MCOSD) is preparing a Draft Management Plan for the Cascade Canyon and White Hill open Space Preserves which border the northeast corner of the Watershed. An EIR is currently being prepared for that plan.
- MMWD and MCOSD continue to implement the *Mount Tamalpais Vegetation Management Plan* which includes construction of fuel reduction zones along specified fire roads, conducting prescribed burning of oak woodlands and grasslands, and other actions intended to reduce fire hazard on the Watershed and preserve and enhance the vegetative diversity of the Watershed.
- MMWD is planning to construct a new, rerouted water pipeline to replace the existing line that delivers water to the Ross Reservoir. The new alignment would travel south on Concrete Pipe Road to Five Corners, east on Shaver Grade Road to Phoenix Junction, and then follow Phoenix Road to the Ross Reservoir.

## 8.0 INITIAL STUDY CHECKLIST

This section documents the anticipated environmental effects of the proposed project using an Initial Study Checklist and providing a brief explanation supporting the findings of each checklist item.

### ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is "Less Than Significant with Mitigation Incorporated" as indicated by the checklist on the following pages.

Agriculture Resources

Aesthetics

Air Quality

Biological Resources

Cultural Resources

Geology & Soils

Hazards & Hazardous Materials

Hydrology/Water Quality

Land Use & Planning

Mineral Resources

Population & Housing

Noise

Public Services

Recreation

Transportation & Traffic

Utilities & Service Systems

Mandatory Findings of Significance



## **EVALUATION OF ENVIRONMENTAL IMPACTS**

This Initial Study is based on CEQA's Environmental Checklist Form. Each item on the checklist is answered as either "potentially significant impact," "less than significant with mitigation incorporated," "less than significant," or "no impact" depending on the anticipated level of impact. The checklist is followed by explanatory comments corresponding to each checklist item.

A "no impact" response indicates that it is clear that the project will not have any impact. In some cases, the explanation to this response may include reference to an adopted plan or map. A "less than significant impact" response indicates that there will be some impact but that the level of impact is insufficiently substantial to be deemed significant. The text explains the rationale for this conclusion. A "less than significant impact with mitigation incorporated" response indicates that there will be a potentially significant impact, but the Initial Study determines there are adequate mitigations, which are described and have been included in the project, to reduce the level of impact to an insignificant level. Finally, a "potentially significant impact" response would indicate that the Initial Study cannot at this stage identify mitigation measures to adequately reduce the impact to a level that is less than significant. In the latter case, an EIR is required.

## **Discussion of Environmental Impacts**

The proposed project will have potentially significant impacts in the areas of air quality, biological resources, cultural resources, geology and soils, hydrology and water quality, and noise. The potentially significant impacts in the areas of air quality, cultural resources, noise, and utilities and services can be reduced to a less than significant level by mitigation measures recommended in this Initial Study.

This Initial Study focuses the future PEIR on erosion and sedimentation impacts and impacts to biological resources. MMWD requests that any reviewer who believes additional areas of impact warrant additional assessment to please inform MMWD and state which areas should be assessed and why.

# I. Aesthetics

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Have a substantial adverse effect on a scenic vista?</i>			X	
b. <i>Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?</i>				X
c. <i>Substantially degrade the existing visual character or quality of the site and its surroundings?</i>			X	
d. <i>Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?</i>				X

a. *Have a substantial adverse effect on a scenic vista?* **Less than significant impact.**

The various types of erosion control projects and decommissioning of trails and road segments all have the aim of reducing erosion and/or returning currently disturbed sites to a more natural state. The projects are generally projects along existing trails and roads. It is not expected that these projects would be noticeable from vantage points off the Watershed. The long-term visual impacts of such projects would be expected to be either less than significant or possibly beneficial.

During actual construction, existing views along the roads and trails where the projects are proposed would be altered. The following are among the possible visual impacts from the projects proposed in the Draft Plan:

- Many Draft Plan projects involve treatment of the existing road or trail surface to better promote drainage and reduce erosion. These projects include construction of rolling dips, placing rock on road surfaces, insloping and outsloping sections of road, installing ditch relief culverts beneath the road or trail, removing ditches, cleaning or grading ditches, and removing the roadside berms. These projects would not noticeably change the existing views of the road or trail as the construction would occur in an area that is currently mainly devoid of vegetation.
- Work to replace culverts at stream crossings (including installation of trash racks and constructing critical dips) would result in removal of vegetation on the existing fill at the crossing. New fill would be placed over the newly placed culvert(s). The fill slopes will be mulched. Topsoil removed when the old fill was taken out will be redistributed along with vegetative litter in order to allow reseeding of the fill slopes. When necessary, the slopes would be reseeded and some locations may be replanted with perennial native shrubs and trees. The public will notice the freshly placed fill slopes. However, these stream crossings are short sections along roads

and trails and generally removed from one another. As such, the visual disturbance is small given the surrounding undisturbed views of native vegetation. In addition, many members of the public may (from an environmental restoration perspective) find the view of the newly placed culvert and fillslopes interesting.

- Road and trail decommissioning will result in some old fillslopes being pulled up to recontour the abandoned trail or road. The road or trail may be ripped and mulched. Stream crossings will be removed and the banks possibly graded back to a stable slope inclination. There could be substantial visual changes involved with such decommissioning. However, because the aim of this decommissioning is to remove the trail or road from use, these changes should not be visible to the public. In addition, over the long term, once the recontoured slopes and streambanks stabilize and become revegetated, views will be of a more natural landscape rather than views of a developed road or trail. This would be a beneficial impact.
- Construction of the six proposed trail reroutes will result in current views of a natural landscape being replaced by views of a new trail. However, this change would be balanced by the fact that the existing trails or roads would be decommissioned and eventually return to a natural landscape. In addition, the number of reroutes is relatively small. Most of the reroutes are for short distances (120 to 540 feet) with only two longer reroutes (1,300 feet of Upper Canyon Trail and 4,075 feet of the Azalea Hill Trail). None of these trail reroutes are visible from more distant public vantage points, so the only people who will notice the change in views are people using the new trails.
- The Draft Plan recommends paving of the 2,700-foot long Bon Tempe Road. This unpaved road receives heavy use as it provides access for fisherpeople and other recreational users to the dam for Bon Tempe Lake. As a result, this road is regularly rocked. Visitors will notice the change from a gravel road to a paved road. However, this change is not considered significant given its relatively short length and the fact that the road already exists (i.e., the view of the road is not of a natural landscape and would not be considered to be "scenic").

Other than the six trail reroutes and the paving of one road, the visual impacts of projects included in the Draft Plan are short-term impacts that will become unnoticeable after a few seasons. These changes are considered less than significant due to the facts that most visual effects would be short-term; most visual effects (including trail reroutes) would be visible only to recreational users and employees traveling the affected road or trail; grading along existing roads and trails would not substantially change views; and projects off the existing road or trail are limited in scope. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- b. *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?* **No impact.**



Projects conducted under the Draft Plan would not be visible from any state scenic highway. There would be no impact per this criterion. Because there would be no impact, the PEIR will not further evaluate this topic.

- c. *Substantially degrade the existing visual character or quality of the site and its surroundings?* **Less than significant impact.**

As discussed under Impact I(a), most visual impacts would be short-term. While they would be noticeable to recreational users of the Watershed, these visual changes would not be substantial and would mainly disappear after a few seasons. The projects would not substantially degrade views of the Watershed. In fact, by reducing gullies, rills, and other drainage problems, views of the road and trail system would improve. As discussed above under Checklist Item, I(a), the six trail reroutes and paving one road would not be expected to have significant visual effects. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- d. *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?* **No impact.**

The Draft Plan projects will not include lights nor improvements that generate any substantial amount of glare. Because there would be no impact, the PEIR will not further evaluate this topic.

## II. Agricultural Resources

<i>In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?</i>				x
b. <i>Conflict with existing zoning for agricultural use, or a Williamson Act contract?</i>				x
c. <i>Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?</i>				x

- a. *Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?* **No impact.**

The site is a part of municipal watershed used to provide potable water to the population of southern Marin County and is not mapped as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Because there would be no impact, the PEIR will not further evaluate this topic.

- b. *Conflict with existing zoning for agricultural use, or a Williamson Act contract?* **No impact.**

The Watershed is not zoned for agriculture and is not in a Williamson Act contract. Because there would be no impact, the PEIR will not further evaluate this topic.

- c. *Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?* **No impact.**

There are no agricultural uses near the Watershed. The Watershed is bounded by either urban uses or publicly owned lands. Thus, the Draft Plan will not affect any agricultural uses on the Watershed or in the area. Because there would be no impact, the PEIR will not further evaluate this topic.

### III. Air Quality

<i>Where available, the significance criteria by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?		X		
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?		X		
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		X		
d. Expose sensitive receptors to substantial pollutant concentrations?		X		
e. Create objectionable odors affecting a substantial number of people?				X

- a. Conflict with or obstruct implementation of the applicable air quality plan? **Less than significant with mitigation incorporated.**

Construction of projects included in the Draft Plan will require the use of heavy equipment (e.g. bulldozers, excavators, graders) to conduct grading and other earthwork. Construction emissions will include emissions from gas and diesel powered equipment and small particulates (i.e., dust) generated during grading operations.

The use of heavy equipment could create fugitive dust and emit nitrogen oxides (NO), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>) hydrocarbons (HC), and particulate matter with a diameter of less than 10 microns (PM<sub>10</sub>). The construction emissions and movement of soil would be short term and temporary, but could still cause adverse effects on local air quality.

The Bay Area Air Quality Management District (BAAQMD) includes construction emissions in the emission inventory that is the basis for regional air quality plans. Construction emissions are not expected to impede attainment or maintenance of air quality standards in the Bay Area.

The BAAQMD, in its CEQA Guidelines, has developed an analytical approach that obviates the need to quantitatively estimate those emissions. Instead, BAAQMD has identified a set of feasible PM<sub>10</sub> control measures for construction activities. The project includes those controls as Mitigation Measure AQ-1 described below, to reduce the effects of construction activities.

### **Mitigation Measure AQ-1**

MMWD will require its staff or contractors to implement, as appropriate, the BAAQMD's basic control measures for emissions of dust during construction, including:

- Water all dry active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and all loose materials, or require trucks to maintain at least two feet of freeboard.
- Apply water as needed to all unpaved access roads, parking areas, and staging areas.
- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, or water twice daily the exposed stockpile of excavated material.
- Limit traffic speeds on unpaved roads to 15 mph.
- Replant vegetation on fill slopes as soon as feasible.
- Suspend excavation and grading activities when winds (instantaneous gust) exceed 25 mph.

### **Impact Significance After Mitigation**

Implementation of these standard dust control measures will reduce dust to levels that the BAAQMD recognizes as being acceptable. Emissions from heavy equipment engines are not expected to be significant since the projects would occur intermittently, equipment would not operate for long periods, and equipment would not be operating for long in any one location. The impact would be reduced to a level that is less than significant. The PEIR will not address this impact further, though Mitigation Measure AQ-1 will be included as a mitigation in the PEIR.

- b. *Violate any air quality standard or contribute substantially to an existing or projected air quality violation?* **Less than significant with mitigation incorporated.**

As noted above, the Draft Plan projects will include the BAAQMD control measures so that the projects are not expected to violate any air quality standard. The PEIR will not address this impact further, though Mitigation Measure AQ-1 will be included as a mitigation in the PEIR.

- c. *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?* **Less than significant with mitigation incorporated.**

As noted above, the Draft Plan projects will include the BAAQMD control measures so that the projects are not expected to contribute a substantial amount of any criteria pollutant. The PEIR will not address this impact further, though Mitigation Measure AQ-1 will be included as a mitigation in the PEIR.

- d. *Expose sensitive receptors to substantial pollutant concentrations?* **Less than significant with mitigation incorporated.**

As noted above, the Draft Plan projects will include the BAAQMD control measures so that the projects are not expected to contribute a substantial amount of any criteria pollutant. Other than construction workers, it is not expected that emissions of dust or other pollutants would affect sensitive receptors since proposed project locations are not located near residences, and roads or trails where construction would be occurring would be closed to recreational users while construction is occurring. The PEIR will not address this impact further, though Mitigation Measure AQ-1 will be included as a mitigation in the PEIR.

- e. *Create objectionable odors affecting a substantial number of people?* **No impact.**

Implementing erosion control actions would not generate odors. Because there would be no impact, the PEIR will not further evaluate this topic.

## IV. Biological Resources

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?</i>	x			
b. <i>Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?</i>	x			
c. <i>Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?</i>	x			
d. <i>Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?</i>	x			
e. <i>Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?</i>			x	
f. <i>Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?</i>				x

- a. *Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service? **Potentially significant impact.***

Construction of projects included in the Draft Plan could occur in areas where special-status species of plants and animals occur. The PEIR will examine the potential impacts to all special-status species known to occur on those parts of the Watershed where projects are recommended. A program level analysis will be provided along with a list of mitigation measures to eliminate or reduce potential impacts to special-status species. Where site-specific botanical surveys of future project sites have been conducted, the results of those surveys will be reported and discussed.

- b. *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service? **Potentially significant impact.***

Some of the projects include work within stream channels. This includes removing old stream crossings to place new culverts or bridges, removing unstable road fills, armoring bridge abutments, constructing armored wet crossings, removing debris from culvert inlets, and armoring fillslopes. Some of these projects may affect riparian vegetation growing on the stream fills, since these fills would partially or wholly be removed to allow the placement of new culverts. In some cases, these fills would be removed and not replaced (when the road or trail is being decommissioned or a bridge is proposed at the crossing). The PEIR will address the impacts of the various types of projects on riparian habitat. Other sensitive habitat that might be affected by future projects includes serpentine areas which support a number of endemic and special-status species. Impacts to this habitat will also be addressed in the PEIR. Impacts will be assessed at a program level which will not include a site-specific assessment. of each site potentially affected.

- c. *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? **Potentially significant impact.***

Projects may affect wetlands. Some roadside ditches will be cleaned or filled to allow proper road drainage. Streamwork will be needed to replace or eliminate culverts. Roadside ditches may contain small wetlands and could be filled when decommissioning roads and trails. In other instances, the decommissioning activities will restore stream channels in their historic locations and possibly restore wetland vegetation. The PEIR will address these and other potential impacts to wetlands and Waters of the U.S. Impacts will be assessed at a program level which will not include a site-specific assessment. of each site potentially affected.

- d. *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?* **Potentially significant impact.**

The projects would not result in any new barriers to wildlife movement. Existing roads and stream crossings would be upgraded, but this upgrading would not interfere with animal movement. Decommissioning of certain trails and roads would not interfere animal movement. Removal of certain stream crossings could promote the migration of fish. No new fill crossings of streams are included. The Draft Plan would not adversely affect fish migration and could improve the ability of salmonids to access tributaries of main streams. Impacts to animal and fish movement and migration will not be further addressed in the PEIR.

Construction could occur where birds have active nests, causing the birds to abandon the nests. This impact will be addressed in the PEIR at a program level of analysis.

- e. *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?* **Less than significant impact.**

The projects included in the Draft Plan would not conflict with any known policies or ordinances protecting biological resources. The County of Marin does have a tree ordinance regulating the removal of trees. Tree removal is not a defined part of any of the projects, though it is possible that some trees might be removed in a few culvert replacement projects, and some trees might be damaged or removed when fill banks are pulled up when decommissioning a road segment, though the District plans to save as many mature trees as possible. However, even if this were the case, the County's tree ordinance does not apply to the projects since the ordinance does not apply to tree removal that is a part of a discretionary project such as this plan plus (per County Code Section 22.75.050, MMWD is exempt from this ordinance. The Draft Plan is a discretionary project. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- f. *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?* **No impact.**

The projects included in the Draft Plan would not conflict with any known Habitat Conservation Plans, Natural Conservation Community Plans, or any approved local, regional, or State habitat conservation plans. By reducing sedimentation of streams, the Draft Plan would be improving habitat. Because there would be no impact, the PEIR will not further evaluate this topic.



## V. Cultural Resources

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?</i>		x		
b. <i>Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?</i>		x		
c. <i>Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?</i>			x	
d. <i>Disturb any human remains, including those interred outside of formal cemeteries?</i>		x		

- a. *Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5? **Less than significant with mitigation incorporated.***

Most projects would be done within already disturbed areas on or along existing roads and trails. However, it is possible that the six trail re-route projects and possibly some other projects would include grading or other work in previously undisturbed areas, and such grading could damage archaeological resources which meet the definition of historical resources as defined in Section 15064.5. These projects could damage or destroy historical or archaeological resources, including human remains, and this would be a potentially significant impact.

### **Mitigation Measure CR-1**

The *Mount Tamalpais Area Vegetation Management Plan Draft EIR* (Leonard Charles and Associates, 1994) contains an Archaeological Sensitivity Map (Figure 21 of that Draft EIR) which identifies areas within the Watershed that may contain cultural resources. This map was prepared by a consulting archaeologist and is used by MMWD to check for archaeological resources prior to conducting Vegetation Management Plan projects. This same map will be used to guide future Draft Plan projects. The following measures will apply:

1. Prior to constructing any project that would involve disturbance of earth outside road or trail beds or other areas previously disturbed when constructing the road and trail system. MMWD staff shall review Figure 21 of the *Mount Tamalpais Area Vegetation Management Plan Draft EIR*. If the project is located within an area that is mapped as "archaeologically sensitive," then the site shall be field surveyed by a qualified archaeological consultant who shall make

recommendations and develop proposals for any procedures deemed appropriate to further investigate and/or mitigate adverse impacts to those resources.

2. If cultural resources are discovered on a site during field surveys or during subsequent construction activities, all earthmoving activity in the area of impact shall be halted until a qualified archaeological consultant examines the findings, assesses their significance, and develops proposals for any procedures deemed appropriate to further investigate and/or mitigate adverse impacts to those resources.
3. In the event that human skeletal remains are discovered, work shall be discontinued in the area of the discovery and the County Coroner shall be contacted. If skeletal remains are found to be prehistoric Native American remains, the Coroner shall call the Native American Heritage Commission within 24 hours. The Commission will identify the person(s) it believes to be the "Most Likely Descendant" of the deceased Native American. The Most Likely Descendant would be responsible for recommending the disposition and treatment of the remains. The Most Likely Descendant may make recommendations to the landowner or the person responsible for the excavation/grading work for means of treating or disposing of the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

#### **Impact Significance After Mitigation**

This mitigation measure ensures that any cultural remains that could be damaged by Draft Plan projects will be preserved or appropriately studied, referenced, and/or curated. This mitigation would reduce the impact to a less than significant level. The impact will not be addressed further in the PEIR, though the mitigation measure will be included in the PEIR.

- b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5? **Less than significant with mitigation incorporated.***

See the discussion above under Checklist Item V(a). Mitigation Measure CR-1 reduces this impact to a less than significant level, and the impact will not be addressed further in the PEIR.

- c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? **Less than significant impact.***

There are no known paleontological resources in the areas that might be affected by projects, and it is not expected that project construction would affect such resources. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- d. *Disturb any human remains, including those interred outside of formal cemeteries?*  
**Less than significant with mitigation incorporated.**

See the discussion above under Checklist Item V(a). Mitigation Measure CR-1 reduces this impact to a less than significant level, and the impact will not be addressed further in the PEIR.

## VI. Geology and Soils

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:</i>		x		
i. <i>Rupture of known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.</i>				
ii. <i>Strong seismic ground shaking?</i>				
iii. <i>Seismic-related ground failure, including liquefaction?</i>				
iv. <i>Landslides?</i>				
b. <i>Result in substantial soil erosion or the loss of topsoil?</i>	x			
c. <i>Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?</i>		x		
d. <i>Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?</i>		x		
e. <i>Have soils incapable of adequately supporting the use of septic tanks or alternative water disposal systems where sewers are not available for the disposal of waste water?</i>				x

- a. *Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*
- i. *Rupture of known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.*

- ii. *Strong seismic ground shaking?*
- iii. *Seismic-related ground failure, including liquefaction?*
- iv. *Landslides? **Less than significant impact.***

The projects included in the Draft Plan involve repairing erosion sources and decommissioning and rerouting a few trails and roads. The projects do not include construction of structures. Recreational users of the watershed will continue to be at risk from earthquakes, but the projects in the Draft Plan do not increase the existing risk. The projects in the Draft Plan are not expected to attract more users to the Watershed than would come if the Plan projects were not constructed. The Draft Plan projects would not significantly increase the risk of people being injured or dying due to seismic activity. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- b. *Result in substantial soil erosion or the loss of topsoil? **Potentially significant impact.***

Implementing all the projects included in the Draft Plan would reduce sedimentation of streams draining the Watershed by up to 186,305 cubic yards of sediment. Over the long term, the Draft Plan will have a beneficial impact as regards erosion. However, constructing some of the projects will result in bared earth (e.g., constructing new fill slopes over replaced culverts at stream crossings) which could result in short-term erosion. This is a potentially significant impact. The Draft Plan contains Best Management Practices (BMPs) to control such erosion. The PEIR will further assess this potential impact and whether at the program level the recommended BMPs are adequate to reduce the impact to a less than significant level. If warranted, additional BMPs will be recommended.

- c. *Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? **Less than significant with mitigation incorporated.***

The Draft Plan includes the repair of 41 landslides located along streams, and this is a beneficial impact. The Draft Plan contains design standards to ensure that new culvert placement and fills meet current construction standards for culverted fill crossings. Most other projects occur along existing roads and trails and would not result in stable sites becoming unstable. Decommissioning roads and trails might cause some subsidence or other soil deformations. However, people would not be using these decommissioned roads and trails, so there would be no danger from minor soil deformations.

The Draft Plan includes recommendations to construct re-routes of a few existing trails and roads. If these new trail routes were not properly selected and the trails not properly designed and constructed, they could fail. While it is unlikely that anyone would be on the trail section if and when it failed, it is possible.

The three types of projects that might require engineering to address unstable soil would be the placement of bridges, construction of crib walls or retaining walls where roads are very near a stream and there is not room to construct an adequate width of roadway, and construction of retaining walls at certain locations. An engineer would need to design the abutments that will support the bridge to address soil instability on either bank. An engineer would need to design any retaining walls or crib walls proposed along Watershed roadways. The Bolinas-Fairfax Road projects are included in the Draft Plan but would be the future responsibility of the County of Marin (since the road is a County road). MMWD has no plans to implement projects identified for that road. If and when the County implements these projects, it would provide the necessary engineering to ensure that unstable slopes are addressed.

### **Mitigation Measure GS-1**

MMWD will have a geotechnical engineer consult in the design of any road bridge project or retaining walls on the Watershed. Major trail reroutes will be reviewed by a geologist or geotechnical engineer. The recommendations of the geologist or geotechnical engineer regarding location, design, and/or construction of the trail will be included in the final trail reroute plan. )

### **Impact Significance After Mitigation**

This mitigation ensures that bridges and new trails would not fail due to unstable soils. The impact would be reduced to a level that is less than significant. The PEIR will not address this impact further, though Mitigation Measure GS-1 will be included as a mitigation in the PEIR.

- d. *Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?* **Less than significant with mitigation incorporated**

The projects in the Draft Plan do not include construction of any buildings, so there is no risk of building failure or risk to people occupying such buildings. People using roads and trails would not be at risk even if expansive soils occurred beneath the trail or road surface. The risk of bridges and retaining walls failing due to expansive soils is a potentially significant impact, but it is reduced to a less than significant level by Mitigation Measure GS-1.

- e. *Have soils incapable of adequately supporting the use of septic tanks or alternative water disposal systems where sewers are not available for the disposal of waste water?* **No impact.**

The Draft Plan does not require construction of waste disposal systems. Because there would be no impact, the PEIR will not further evaluate this topic.

## VII. Hazards and Hazardous Materials

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?</i>				X
b. <i>Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?</i>				X
c. <i>Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?</i>				X
d. <i>Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?</i>				X
e. <i>For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport, would the project result in a safety hazard for people residing or working in the project area.</i>				X
f. <i>For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?</i>				X
g. <i>Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?</i>			X	
h. <i>Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?</i>				X

- a. *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? **No impact.***

The Draft Plan projects include erosion-control, trail construction, and trail and road decommissioning projects. Construction of these projects does not include any transport, use, or disposal of regulatory quantities of hazardous materials. No hazardous materials will be stored on the Watershed, and there would be no potential for exposure of the public to hazardous materials. During construction of the projects, construction equipment will use gasoline and diesel. These activities would be typical of any construction project and would not create any unusual hazardous conditions. Because there would be no impact, the PEIR will not further evaluate this topic.

- b. *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? **No impact.***

See the discussion of Checklist Item VII(a) above.

- c. *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? **No impact.***

See the discussion of Checklist Item VII(a) above.

- d. *Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? **No impact.***

There are no known hazardous material sites on the Watershed. Because there would be no impact, the PEIR will not further evaluate this topic.

- e. *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport, would the project result in a safety hazard for people residing or working in the project area. **No impact.***

The site is not within the area of any airport land use plan. Because there would be no impact, the PEIR will not further evaluate this topic.

- f. *For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? **No impact.***



The Watershed is not within the vicinity of a private airstrip. Because there would be no impact, the PEIR will not further evaluate this topic.

- g. *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?* **Less than significant impact.**

Storm-proofing the road and trail system will reduce the chance of roads and trails failing, especially during peak storms. This will benefit emergency response and evacuation. Emergency response on roads where construction was occurring could be hampered (e.g., when a culvert is being replaced at a stream crossing). However, MMWD staff will be aware of any possible road closure so that alternative routes can be used. Because no road would be closed to passage for more than a few days, this is not considered a significant impediment to emergency response. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- h. *Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?* **No impact.**

The Draft Plan projects will not include the construction of residences or a business where people will work. Improvements included in the Draft Plan would not be expected to attract more users to the Watershed than would come if projects included in the Plan were not constructed. MMWD currently works to reduce fire hazard on the Watershed by implementing the recommendations of its *Mount Tamalpais Vegetation Management Plan*. Part of that plan is the provision of safe access to critical parts of the Watershed. By improving the ability of Watershed roads to withstand storms, the Draft Plan would be beneficial as regards this Checklist Item. Because there would be no impact, the PEIR will not further evaluate this topic.

## VIII. Hydrology and Water Quality

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Violate any water quality standards or waste discharge requirements?</i>	X			
b. <i>Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?</i>			X	
c. <i>Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?</i>	X			
d. <i>Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?</i>			X	
e. <i>Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?</i>			X	
f. <i>Otherwise substantially degrade water quality?</i>			X	
g. <i>Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?</i>				X
h. <i>Place within a 100-year flood hazard area structures which would impede or redirect flood flows?</i>				X
i. <i>Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?</i>			X	
j. <i>Inundation by seiche, tsunami, or mudflow?</i>			X	

- a. Violate any water quality standards or waste discharge requirements? **Potentially significant impact.**

Water quality within the area is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB) which sets forth water quality objectives for the area in the *San Francisco Bay Region Water Quality Control Plan* (Basin Plan). The RWQCB is the local agency that issues wastewater discharge permits under the National Pollutant Discharge Elimination System (NPDES). The RWQCB will be responsible for providing Water Quality Certification to the Army Corps permit required for the Draft Plan.

As discussed previously under Impact VI(b), the Draft Plan projects could result in soil erosion and sedimentation of streams draining the Watershed. The PEIR will address these short-term erosion impacts and review the Draft Plan-recommended BMPs to determine whether at a program level they are sufficient to reduce erosion impacts to a less than significant level. Where warranted, additional BMPs will be recommended.

- b. *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?* **Less than significant impact.**

Draft Plan projects would not require groundwater withdrawals. The Draft Plan includes the recommendation to pave the currently unpaved 2,700-foot long Bon Tempe Road. This paving would equal about 1.25 acres (calculated as a 20-foot wide paved road). The Watershed contains nearly 19,000 acres, so the loss of 1.25 acres of recharge area is considered less than significant. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- c. *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?* **Potentially significant impact**

The Draft Plan contains about 566 stream crossing projects. Many of these are minor improvements of fords of ephemeral channels on trails, but many include replacing culverts and/or taking out old stream fills. Where roads and trails are planned for decommissioning, old stream fills will be removed to return the stream to its historic bed. This is a beneficial impact of the Draft Plan. Where culverts are to be replaced, there is the potential for short-term erosion as described previously under Checklist Items VI(b) and VIII(a). This erosion impact will be addressed in the PEIR, but the PEIR will not further address the potential impact of altering the course of streams.

- d. *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?* **Less than significant impact.**

Other than paving one 2,700-foot long road, the Draft Plan projects will not create new impervious surfaces that would increase runoff. The road to be paved leads from Sky Oaks Road to the dam on Bon Tempe Lake and drains in a short distance to Alpine Lake. The increased runoff from this road would not cause flooding. Decommissioning eleven roads and trails would reduce runoff to streams. Road repairs would create a more natural runoff pattern where water tended to flow in a dispersed manner downslope rather than being concentrated in ditches and gullies. This would slow runoff to streams. Overall, Draft Plan projects would likely decrease flooding potential. In any case, the impact is considered to be at least less than significant. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- e. *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?* **Less than significant impact.**

As described above, the only project that could generate increased runoff would be the paving of Bon Tempe Road. The road travels through a relatively flat area. Existing drainage drains the road towards Alpine Lake. The increased runoff generated by paving this road would not exceed the capacity of existing ditches and swales. This road is already used by motor vehicles, so its is not expected that its future use would generate significant additional amounts of pollutants. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- f. *Otherwise substantially degrade water quality?* **Less than significant impact.**

Other than potential impacts from soil erosion, as discussed previously under Impact VI(b), the project will not include features that will affect water quality. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- g. *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?* **No impact.**

The Draft Plan does not include the construction of housing. Because there would be no impact, the PEIR will not further evaluate this topic.

- h. *Place within a 100-year flood hazard area structures which would impede or redirect flood flows?* **No impact.**

The Draft Plan specifically calls for replacing stream fills where culverts or the fill itself cannot withstand the flows of a 100-year storm. This is a major benefit of the Draft Plan since many of these existing stream crossings could fail if a 100-year storm event were to occur before the Draft Plan recommendations are implemented. Such failure could lead to substantial sedimentation of streams. Because there would be no impact, the PEIR will not further evaluate this topic.

- i. *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?* **Less than significant impact.**

The Draft Plan does not include the construction of residences or businesses. The Watershed contains five dams. People are at risk if these dams fail. However, the projects included in the Draft Plan are not expected to attract additional users to the Watershed, so the Draft Plan would not increase this existing risk. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- j. *Inundation by seiche, tsunami, or mudflow?* **Less than significant impact.**

Recreational users and employees are at risk from a seiche (a wave caused by an earthquake in a body of water like a lake). However, the projects included in the Draft Plan are not expected to attract additional users to the Watershed, so the Draft Plan would not increase this existing risk. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

## IX. Land Use and Planning

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Physically divide an established community?</i>				x
b. <i>Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?</i>				x
c. <i>Conflict with any applicable habitat conservation plan or natural community conservation plan?</i>				x

- a. *Physically divide an established community?* **No impact.**

The Draft Plan projects are all on the MMWD Watershed. The projects are not within an established community and would therefore not divide any community.

- b. *Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?* **No impact.**

The *Marin Countywide Plan* designates the site as Open Space. The Draft Plan projects are all aimed at reducing erosion and enhancing the ecological health of the Watershed. All these projects would be consistent with the policies of the *Marin Countywide Plan*. The Draft Plan would be consistent with all applicable land use plans and policies. Consistency with the requirements of agencies with jurisdiction over specific resources, including the Army Corps, RWQCB, California Department of Fish and Game, U.S. Fish and Wildlife Service, and NOAA-Fisheries will be assessed in the PEIR. Because there would be no impact, the PEIR will not further evaluate this topic.

- c. *Conflict with any applicable habitat conservation plan or natural community conservation plan?* **No impact.**

There is no adopted habitat conservation plan or natural community conservation plan for the Watershed. Because there would be no impact, the PEIR will not further evaluate this topic.

## X. Mineral Resources

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?</i>				x
b. <i>Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?</i>				x

- a. *Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?* **No impact.**

The *Marin Countywide Plan* does not identify any mineral resources on the Watershed, and MMWD does not allow quarrying on the Watershed. Thus, there would be no loss of mineral resources. Because there would be no impact, the PEIR will not further evaluate this topic.

- b. *Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?* **No impact.**

The *Marin Countywide Plan* does not identify a mineral resource recovery site in the Watershed. Because there would be no impact, the PEIR will not further evaluate this topic.

## XI. Noise

<i>Would the project result in:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?</i>		x		
b. <i>Exposure of persons to or generation of excessive groundborne vibration of groundborne noise levels?</i>				x
c. <i>A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?</i>				x
d. <i>A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?</i>		x		
e. <i>For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?</i>				x
f. <i>For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?</i>				x

- a. *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?* **Less than significant with mitigation incorporated.**

Construction of the projects involves the use of heavy equipment including bulldozers, excavators and graders. Maximum noise levels during construction are expected to be 75 to 83 decibels (dBA) at 50 feet. Noise levels decrease by about 6 dBA for each doubling of the distance between the noise source and the receptor.

Most of the nearly 1,000 Draft Plan projects are located well inside the MMWD Watershed, far removed from any private residence. There are a few projects located near the MMWD property line, but generally homes are not located near these locations.

The *Marin Countywide Plan* Noise Element includes Policy N-2.4 which states "Minimize impacts from excessive noise levels due to construction activity. During all phases of construction, measures should be taken to minimize the exposure of neighboring properties to excessive noise levels from construction-related activity." Program N-2.4a under this policy states, "Limit Construction Hours. The Community Development Agency reserves the right to set hours for construction-related activities involving the use of machinery, power tools or hammering. The type of construction, site location and noise-sensitivity of nearby land uses will determine the hours of construction. The conditions of approval will specify hours for staging and construction activities. Special consideration shall be given to homeowners who perform their own work."

While it is not expected that construction noise would occur for any extended duration of time in areas where it would be audible to residents of private homes, it is possible that a few projects would occur where construction noise could be annoying to residents. This is a potentially significant impact.

#### **Mitigation Measure N-1**

Project construction in areas within one-quarter mile of a private residence shall be limited to the hours of 7:30 a.m. to 5:00 p.m. on weekdays. No work shall be allowed on Saturdays, Sundays, or holidays.

#### **Impact Significance After Mitigation**

The mitigation measure ensures that construction noise would not bother nearby residences outside of normal working hours on weekdays or on weekends and holidays. This would reduce the impact to a less than significant level. The PEIR will not address this impact further, though Mitigation Measure N-1 will be included as a mitigation in the PEIR.

- b. *Exposure of persons to or generation of excessive groundborne vibration of groundborne noise levels?* **No impact.**



Project grading is not expected to cause undue groundborne noise or vibrations, and homes are not near project sites. Because there would be no impact, the PEIR will not further evaluate this topic.

- c. *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?* **No impact.**

Once Draft Plan projects construction is completed, the projects will not generate noise. Because there would be no impact, the PEIR will not further evaluate this topic.

- d. *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?* **Less than significant with mitigation incorporated.**

As described above under Impact XI(a), project construction will generate short-term noise. However, as described under that impact, it is expected that the impact will be less than significant with the incorporation of limits on when construction can occur.

- e. *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?* **No impact.**

The Watershed is not within an airport land use plan. Because there would be no impact, the PEIR will not further evaluate this topic.

- f. *For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?* **No impact.**

The Watershed is not near a private airstrip, and the Draft Plan projects do not include housing or employment where people would be susceptible to noise. Because there would be no impact, the PEIR will not further evaluate this topic.

## XII. Population and Housing

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?</i>				X
b. <i>Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?</i>				X
c. <i>Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?</i>				X

- a. *Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?* **No impact.**

The Draft Plan contains projects to reduce erosion and allow MMWD to manage its road and trail system in an efficient and environmentally sound fashion. These projects would not induce growth or development in surrounding communities. Because there would be no impact, the PEIR will not further evaluate this topic.

- b. *Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?* **No impact.**

The Draft Plan does not contain housing, and the Draft Plan will not require that residences be demolished or removed. Because there would be no impact, the PEIR will not further evaluate this topic.

- c. *Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?* **No impact.**

The property is a municipal watershed. No people will be displaced during project construction or operation. Because there would be no impact, the PEIR will not further evaluate this topic.

### XIII. Public Services

<i>Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
<i>Fire protection?</i>				X
<i>Police protection?</i>				X
<i>Schools?</i>				X
<i>Parks?</i>				X
<i>Other public facilities?</i>				X

- a. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:*

*Fire protection? **No impact.***

The projects included in the Draft Plan will not require fire protection. The projects may enhance the ability of fire suppression agencies to access the Watershed. Because there would be no impact, the PEIR will not further evaluate this topic.

*Police protection? **No impact.***

The projects would not require additional police or ranger response. Because there would be no impact, the PEIR will not further evaluate this topic.

*Schools? **No impact.***

The Draft Plan does not include the construction of housing or new employment opportunities. There will be no direct impact on schools. Because there would be no impact, the PEIR will not further evaluate this topic.

*Parks?* **No impact.**

The projects do not include housing or businesses. Here would be no increase in the area population and therefore no need for additional parks. Because there would be no impact, the PEIR will not further evaluate this topic.

*Other public facilities?* **No impact.**

The projects will not create a demand for improvements to other public facilities. Because there would be no impact, the PEIR will not further evaluate this topic.

#### **XIV. Recreation**

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?</i>			x	
b. <i>Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?</i>				x

- a. *Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?* **Less than significant impact.**

Draft Plan projects do not include the construction of new housing or employment opportunities. The projects will not create any direct demand for recreational facilities. The Draft Plan recommends decommissioning 7 roads and 4 trails. During previous public meetings, one commenter noted that closing these roads and trails would result in increased traffic on the other roads and trails that provide access to the locations the closed roads and trails previously accessed (since all but 2 short dead end sections recommended for closure are redundant routes).

The Initial Study authors believe that the possible increased use of other roads and trails would not have a significant impact on resources along these roads and trails for the following reasons:

- The target trails and roads are mainly distant from population centers and the primary Watershed trailheads. They are lightly used so the number of displaced users moving to a parallel road or trail would not be significant.
- Increased use of the other roads and trails would not cause significant impacts once those roads and trails are storm-proofed. There would not be significant erosion from the increased use. Wildlife residing in the area would not be significantly affected since the road or trail is already in use. Vegetation would not be impacted since there would be no need to widen the road or trail, and increased use of storm-proofed roads and trails should not result in any substantial trail widening.
- Even if there were some unforeseen impact to plants and animals living along the trail or road, the impact to wildlife and vegetation would be significantly outweighed by the additional habitat available to native plants and animals that would result from decommissioning the target trails and roads. The Draft Plan calls for closing 2.4 miles of roads and about 1.3 miles of trails. This provides a much larger area for native plant re-establishment than could be damaged by any trail or road widening along the alternate routes. More importantly, the closing of these roads and trails will result in a large block of habitat where people rarely travel, and this will benefit wildlife, particularly species that are sensitive about human presence when nesting and rearing their young.

On these bases, the impacts of increased use on other existing roads and trails resulting from recommended road and trail decommissioning is considered to be a less than significant environmental impact. It is possible that some existing users of the Watershed may dislike the recommended closures, either because they like the road or trail proposed for closure and/or fear that the closure will result in additional uses of the alternative trail or road, and that such increased use could lead to increased user conflicts on roads and a loss of the sense of isolation on trails or roads. The concerns regarding personal predilection for a road or trail and the loss of the sense of isolation are not environmental issues. People holding such views will need to express their desires to the District to see if they can prevail when the District prepares the Final Plan.

As regards the potential traffic safety issue, a substantial number of bicyclists are not expected to use the roads recommended for closure. All but two of the roads recommended for decommissioning are dead-ends where bicycle use is expected to be minimal. One closure (the lower portion of the Grassy Slope Road) is paralleled by another fire road immediately to the east (Continental Cove Road). This road is in the remote northwest portion of the Watershed and receives little use. The other road closure are two small road segments below Peters Dam, and these roads are paralleled by roads to the east and west. It is not expected that there would be a significant increase on alternate roads. MMWD will continue to patrol roads to enforce all user regulations. This possible additional use of fire roads by bicyclists displaced from roads recommended for closure is not expected to be significant. This impact would be less than significant and will not be assessed further in the PEIR.

- b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?  
**No impact.**

Draft Plan projects do not include recreational facilities or require the construction or expansion of recreational facilities. See the discussion above under Checklist Item XIV(a) regarding possible impacts to existing recreational use of the Watershed. Because there would be no impact, the PEIR will not further evaluate this topic.

## XV. Transportation/Traffic

<i>Would the project result in:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections?)			x	
b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			x	
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				x
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			x	
e. Result in inadequate emergency access?				x
f. Result in inadequate parking capacity?				x
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?			x	

- a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of

*vehicle trips, the volume to capacity ratio on roads, or congestion at intersections?* **Less than significant impact.**

Individual projects included in the Draft Plan would require the transport of heavy equipment and supplies (e.g., culverts) to and from the Watershed. It is not expected that transport of such equipment and supplies would generate more than 5-10 trips per project, and possibly less since the equipment may stay on the Watershed for extended periods to construct a number of projects in any one particular area. The roads most likely to be used to access the Watershed would be Sir Francis Drake Boulevard, Bolinas-Fairfax Road, Lagunitas Road, Blithedale Avenue, Shoreline Highway, Panoramic Highway, and Ridgecrest Boulevard. These are all major arterials capable of handling occasional large truck trips carrying supplies and equipment.

Most of the work to be done for each road project would be done using heavy equipment. Few hand laborers are required. For example, for all recommended projects in the Old Mill Creek basin, heavy equipment operators would be required for 1,141 hours and hand laborers for 109 hours. This would mean that every day, 2 to 3 heavy equipment operators and probably 1 to 2 other laborers would drive to the Watershed. This increase of 3-5 round trips per day on the major arterials that provide access to the Watershed would be less than significant and would not be considered substantial in relation to the existing traffic load of these streets. The number of trips generated is the approximate equivalent of the trips generated each day by one single family residence. In addition, this increased traffic would occur sporadically over 20 years. Some months or years workers may travel one route to access the Watershed (e.g., west on Sir Francis Drake Boulevard to Bolinas-Fairfax Road to Sky Oaks) and then this route might not be used for a long time because projects are in another area where access would be provided by a different road system. The sporadic nature of the traffic increase plus the small number of trips generated make this a less than significant impact. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- b. *Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?* **Less than significant impact.**

See the discussion under Impact XV(a) above. Construction-generated traffic will consist of an average of about 3-5 round trips per day on a variety of streets in southern Marin. This would not result in any permanent change in the level of service on any other of these public streets. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- c. *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?* **No impact.**

Draft Plan projects would not affect air traffic patterns since the projects do not involve construction of buildings where people would be present on a full-time basis. Because there would be no impact, the PEIR will not further evaluate this topic.

- d. *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?* **Less than significant impact.**

The Draft Plan calls for improving the surface of the road system so that the roads will be "storm-proofed." Road treatments would rid the road surfaces of gullies and rills thereby making it safer to use the roads. Rolling dips will be constructed, where warranted, in roads. If improperly constructed, these dips could pose a hazard for bicyclists and motorists. Driving too fast through an improperly designed and constructed rolling dip could cause the bicyclist or driver to become airborne as they crest the top of the dip. This could lead to accidents. However, a properly designed rolling dip begins 50 to 100 feet up the road or trail from where the axis of the dip is planned. A dip with this amount of length of run would not be abrupt. In addition, drivers of motor vehicles on Watershed roads would either be MMWD staff or contractors/employees of the District. Such drivers would drive the roads at the 15 mph speed limit plus most of these drivers would be aware of the locations of rolling dips. These dips should not be a significant safety hazard for motor vehicle users. MMWD regulations state that the maximum speed for bicycles is 15 miles per hour (mph) or 5 mph on turns and when passing. At this speed, properly constructed rolling dips should not pose a significant safety hazard. Bicyclists riding downhill at illegal speeds could become airborne at improperly constructed or abrupt rolling dips. However, bicyclists who tend to break the law are also generally experienced off-road bicyclists and would be expected to safely negotiate even improperly constructed rolling dips. The construction of rolling dips on Watershed roads is not expected to be a significant safety hazard. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- e. *Result in inadequate emergency access?* **No impact.**

By storm-proofing the road system, MMWD will facilitate emergency access. Because there would be no impact, the PEIR will not further evaluate this topic.

- f. *Result in inadequate parking capacity?* **No impact.**

The Draft Plan projects do not require new parking. Contractors will park at existing parking locations at MMWD facilities, road turnouts, etc. Because there would be no impact, the PEIR will not further evaluate this topic.

- g. *Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?* **Less than significant impact.**



The Draft Plan projects would not conflict with any plans or policies adopted by the County of Marin to encourage alternative means of transportation such as bicycles. All routes currently open to bicycles will remain open to bicycles with the exception of the seven roads (about 2 miles of road) that are proposed to be decommissioned. These roads would be closed to all users. However, given that the Watershed contains about 100 miles of road available to bicyclists, the decommissioning of about 2 miles is less than significant. In addition, all of these roads are redundant (there is another route available) or short spurs off dead-end roads. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

## XVI. Utilities and Service Systems

<i>Would the project:</i>	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?</i>				X
b. <i>Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?</i>				X
c. <i>Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?</i>	X			
d. <i>Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?</i>			X	
e. <i>Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?</i>				X
f. <i>Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?</i>			X	
g. <i>Comply with federal, state, and local statutes and regulations related to solid waste?</i>			X	

- a. *Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? **No impact.***

The Draft Plan projects will not generate wastewater and thus not exceed wastewater treatment requirements of the Regional Water Quality Control Board. Because there would be no impact, the PEIR will not further evaluate this topic.

- b. *Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? **No impact.***

The Draft Plan projects are road and trail construction projects, and they do not require the expansion or construction of new water or wastewater facilities

- c. *Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? **Potentially significant impact.***

The Draft Plan specifically addresses this Checklist item since it recommends hundreds of improvements to the existing storm drain system on the Watershed. These projects may have potentially significant impacts as described in other sections of this Initial Study. Those impacts, including the impacts of erosion on water quality and biotic habitat, filling of wetlands, impacts to special-status species and sensitive habitats, and other biological impacts will be assessed in the PEIR.

- d. *Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? **Less than significant impact.***

Some road projects require watering of the road surface during construction. Water is available on the Watershed. The amount of water that would be used is small and would have a less than significant impact on MMWD's water supplies. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- e. *Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? **No impact.***

The Draft Plan projects do not generate wastewater and thus does not use any capacity in any wastewater treatment and disposal facility. Because there would be no impact, the PEIR will not further evaluate this topic.

- f. *Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?* **Less than significant impact.**

All excess soil removed from projects requiring fill removal or cuts will be used for other projects or disposed of in a location where the material would not erode. It would not be hauled to a landfill. The only materials that may be hauled to a landfill would be old culverts removed when repairing stream crossings. The Watershed is served by the Redwood Landfill, located at 8950 Redwood Highway in Novato. Sufficient capacity is estimated to exist until the year 2039. The Draft Plan calls for removing 305 culverts over the next twenty years or an average of about 15 per year. This number of old culverts should not significantly affect the capacity of the Redwood Landfill. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

- g. *Comply with federal, state, and local statutes and regulations related to solid waste?* **Less than significant impact.**

Excess excavated materials and any other waste will be disposed of in compliance with applicable regulations related to solid waste. Because there would be a less than significant impact, the PEIR will not further evaluate this topic.

## **XVII. Energy Use**

The Checklist does not contain items related to energy use, though the *CEQA Guidelines* require that energy use be assessed in EIRs. Gasoline and diesel fuel will be used to operate the heavy equipment used for constructing Draft Plan projects. However, over the long term, the Draft Plan projects will reduce the need for annual road grading, road repairs, and stream crossing repairs. It is expected that over the long term, the Draft Plan would reduce fuel and energy use required for maintaining the Watershed roads and trails. The impact to energy is less than significant and will not be further discussed in the PEIR.

## XVIII. Mandatory Findings of Significance

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. <i>Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?</i>	x			
b. <i>Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?</i>	x			
c. <i>Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?</i>		x		

- a. *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? **Potentially significant impact.***

Projects included in the Draft Plan will over the long term improve the quality of the environment. However, short-term construction impacts could adversely affect biological resources, water quality, and cultural resources. The potential impacts to cultural resources can be reduced to a less than significant level by implementing the mitigation measure included in this Initial Study. The PEIR will assess the impacts to water quality and biological resources.

- b. *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the*

*effects of other current projects, and the effects of probable future projects)?*  
**Potentially significant impact**

Projects included in the Draft Plan plus other projects in the area could have cumulative impacts as regards stream sedimentation, impacts to water quality, and impacts to biological resources. These areas of impact will be addressed in the PEIR. Draft Plan projects are not expected to contribute impacts that could be part of a significant impact for other areas, including aesthetics, agricultural resources, air quality, cultural resources, geology and soils (other than soil erosion), hazards and hazardous materials, hydrology (other than sedimentation impacts), land use and planning, mineral resources, noise, parks and recreation, population and housing, public services and utilities, and transportation and traffic. The cumulative impact analysis in the PEIR will be limited to an assessment of impacts regarding erosion and sedimentation impacts on water quality and impacts to biological resources.

- c. *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?* **Less than significant with mitigation incorporated.**

As discussed in previous sections of this Initial Study, project construction could generate air pollution and noise which could adversely affect workers and nearby residents. The mitigation measures recommended to control dust and noise would reduce these impacts to a less than significant level. The Draft Plan projects, including recommended mitigation measures, would have a less than significant effect on human beings.

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