Marin County Flood Control and Water Conservation District

Marin County Stream Maintenance Manual



MARIN COUNTY STREAM MAINTENANCE MANUAL

Developed by the:

Marin County Flood Control and Water Conservation District

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ACRONYMS

AMM	Avoidance and Minimization Measure
BA	Biological Assessment
BASMAA	Bay Area Stormwater Management Agencies Association
BMP	Best Management Practice
CEMAR	Center for Ecosystem Management and Restoration
CEQA	California Environmental Quality Act
CCNB	Conservation Corps of the North Bay
CDFW	California Department of Fish and Wildlife
CIP	Capital Improvement Program
CNDDB	Californian Natural Diversity Database (CDFW)
CRLF	California red-legged frog
CWA	Clean Water Act
DBH	diameter at breast height
DPW	County of Marin Department of Public Works
ECC	Environmental Compliance Coordinator
FCZ	Flood Control Zone
FEMA	Federal Emergency Management Agency
FishNet 4C	Fishery Network of the Central California Coastal Counties
GAMM	General Avoidance and Minimization Measure
LWD	Large Woody Debris
MCSTOPPP	Marin County Stormwater Pollution Prevention Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Association
OHWM	Ordinary High Water Mark
RMA	Routine Maintenance Agreement
RWQCB	Regional Water Quality Control Board
SMHM	Salt marsh harvest mouse
SMP	Stream Maintenance Program
STRAW	Students and Teachers Restoring a Watershed
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

GLOSSARY

Active Channel	The cross-sectional area of a creek, stream, or river channel which is formed by flows with a recurrence interval (Q) of approximately 2.2 years.
Biologist	A biologist is a person who has a combination of academic training and professional experience in the biological sciences.
Bioengineering	Bioengineering is the application of principles of engineering and natural sciences to flood control maintenance. Applications from both fields, such as installation of willow walls and/or brush mattresses, may be used in the field of flood control engineering to reduce the impacts on the natural and urban environment.
District environmental staff	Refers to the Marin County personnel who will oversee the implementation of the SMP, including preparation of pre-notification lists, scheduling pre-construction surveys, conducting trainings, and writing annual reports.
Emergency Project	As defined in the State Fish and Wildlife 1600 code.
Environmental Compliance Coordinator	(ECC) refers to the Marin County personnel who will ensure the implementation of general conditions and prohibitions, AMMs, and BMPs associated with all maintenance activities.
Flood Control Channel	Engineered channels that have been designed or constructed for drainage or flood control purposes.
Flood Control Structure	Levee, dams, and artificially constricted channels for flood control purposes.
Floodplain	Floodplains are land areas adjacent to rivers and streams that are subject to recurring inundation.
Low Flow Channel	The physical path within the channel of a river or creek where water flows through during seasonal low flow periods.

Maintenance Supervisor	Refers to the lead supervisor, crew chief, foreman, or other lead personnel of the District, County Roads crews, CCNB, STRAW, and/or private contractors.
Mitigation	Work done to compensate for impacts from maintenance. Usually will entail invasive/non-native plant and trash removal.
Natural Channel	Streams or watercourses that have not been engineered for drainage or flood control purposes; may include natural bottom channels with erosion control structures, such as riprap, on their banks.
Pond	Includes any natural or man-made stock pond, detention basin, or sediment basin.
Program Area	Each *program area* is defined as the maintenance activities completed within an individual Flood Control Zone or County Service Area. For the purposes of this SMP, there are seven program areas (Flood Control Zones 1, 3, 4, 5, 7 and 9, and County Service Area 13).
Project Area	Includes a creek, or tributaries to a creek that have similar habitat and species composition, where vegetation maintenance occurs, usually within a small portion of that area. Can also include a Zone if the vegetation maintenance is minimal (i.e., a small section of linear feet).
Riparian Area	The area located along the edge of a channel, generally on the floodplain, characterized by access to and influence of the channel, but not in it. A riparian zone or riparian area is the interface between land and a river or stream.
Site Fact Sheet	A one-page sheet prepared for each of the distinct sites; the fact sheet will contain the site ID and location, the habitats and land uses on site, special status species that may occur at the site, and AMMs and BMPs to employ at the site to avoid and minimize environmental impacts.
Structure	Storm drain outfalls, tide gates, slide gates, culverts, revetments, bank protection, energy

	dissipaters, grade control structures, sediment basins, weirs, diversion structures, trash racks, stream gauge structures, fish ladders, fish screens, utility lines, crossings, bridge piers and pump stations.
Site	Sections of a project area that are further divided by habitat type, species, or section of creek the District maintains or sediment, and pump station sites. A site is also a sediment removal area or a pump station.
Terrace	Between the top of bank of the creek and the valley wall, the higher elevation levels or flats are abandoned floodplains called terraces. It is only the lower level near the stream that is the modern or present day floodplain.
Top of Bank	The first major change or break in slope of the incline from the ordinary high water level of a water body moving up the bank. A major change is a change of ten degrees or more.
Upland Area	Area above the normal reach of a creek, stream or river, characterized by non-wetland or riparian vegetation.

1.0 PROGRAM OVERVIEW

1.1 Introduction

The Marin County Flood Control and Water Conservation District (District) was formed in 1955 by an act of the California State Legislature with the primary purpose of controlling flood and storm waters of streams which flow within and into the county. The Marin County Board of Supervisors sits as its board and the District is staffed by the County of Marin Department of Public Works (DPW). While the boundaries of the District are contiguous with those of the county, the District can only do work in seven flood control zones that have been established to address specific issues related to flooding within individual watersheds. Flood zones cover only a minority of the county and include only seven of the 14 watersheds within the county. Even within the flood zones, the District can only do work where it has property or permission (in the form of an easement or agreement) from property owners.

The District holds legal title to thousands of acres of flood control lands (mostly along channels and in the Novato Baylands) and holds easements on many additional channels. It maintains 37 miles of stream channels, several basins, and numerous flood control facilities (18 permanent and 4 portable pump stations; 10 miles of levees; tide gates, and other facilities) to ensure flood conveyance, the proper functioning of flood control facilities, and access to streams, channels, and facilities.

1.2 Historical Context of Flood Management in Marin County

The Marin County Flood Control and Water Conservation District has a long history of being on the cutting edge of environmentally-sensitive flood control work. The District hired its first Creek Naturalist in 1972 to inspect creeks and direct District work within the creeks with habitat preservation and species protection as goals. The District has worked with the Conservation Corps since 1983 to implement creek maintenance projects, and District staff regularly inspects many of our creeks and enforce various local and other regulations which protect them. The District has implemented the Marin County Watershed Program since 2008; the program focuses on watersheds within established County flood zones to integrate flood protection, creek and wetland restoration, fish passage and water quality improvements with public and private partners. In addition, the District works closely with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP), which is a joint effort by the cities and County of Marin to reduce pollutants in stormwater runoff. District staff also implements the County's Fish Passage Program, established by the County Board of Supervisors in 2005, that prioritizes and removes migration barriers to spawning salmon to the upper reaches of Marin's creeks.

As was the norm for 1960's flood control efforts, the U. S. Army Corps of Engineers (USACE) considered three concrete channel flood control projects in Marin County: Coyote Creek from the mouth to Maple Street in Tamalpais Valley; Corte Madera Creek from Larkspur to Fairfax in Ross Valley; and Novato Creek from the mouth to Grant Avenue. Only the first was built in its entirety: the Coyote Creek project was completed in 1967; the Corte

Madera Creek channel was stopped at the College of Marin in 1971 (with one more portion in the works to be completed from College of Marin to the Sir Francis Drake Blvd. bridge just before the Ross/San Anselmo line, and with San Anselmo and Fairfax permanently opting out of the project); and the Novato project was not built at all.

Instead, the Novato Flood Control Zone 1 Advisory Board developed an innovative eight-phased program of projects in 1985 following passage of a voter approved bond measure. Projects included raising the Stafford Lake dam, increasing capacities of Novato, Warner and Arroyo Avichi creeks, constructing a bypass at Arroyo Avichi, and constructing a storm water detention pond at Deer Island, stabilizing eroded banks and restoring riparian function.

In many cases, the District maintains storm water pipes and/or flood control facilities that were constructed well before the era of environmental regulation. Nonetheless, it continues to limit its scope of activities to minimize additional impacts to the environment. Within Marin communities, progressive city councils and community members showed an early desire and willingness to acquire lands and prioritize protection of native riparian corridors and wetlands.

While creeks in Marin County have been impacted by to development, in general they remain largely above ground and functional. Marin's engaged and environmentally focused community has a long history of supporting stream side protection during development. This stewardship combined with Marin County's commitment to conducting flood control maintenance work in an environmentally sensitive manner has resulted in many of our creeks and adjacent native riparian corridors and lands supporting habitat for endangered species including steelhead (*Oncorhynchus mykiss irideus*), California Ridgway's rail (*Rallus obsoletus obsoletus*), and salt marsh harvest mouse (*Reithrodontomy raviventris*).

We are proud of our communities' history of habitat conservation and continue to balance their flood management needs with the needs of our many creek inhabitants in the most sensitive way possible.

1.3 Manual Organization

This document contains several chapters, tables, figures and maps, and data sheets within the main chapters and appendices.

Chapter 1 introduces the program and describes the program activities, partners and contractors, and foundation documents. Chapter 2 describes the environmental and geomorphic settings of the project works areas. Chapter 3 details the impact avoidance and minimization measures built into the project. Chapter 4 provides an overview of the different maintenance activities, and Chapters 5-9 detail each activity type, listing the program activities, activity-specific maintenance goals, triggers, and conditions, activity scope, timing and frequency, and contractor details. Chapter 10 outlines how the program is managed, describes the annual work cycle, and explains the data collection and

management procedures. Finally, Chapter 11 discusses the regulatory framework pertaining to the program.

Appendix A contains the Master List of Program Areas and Sites. Each site is described as to its location, municipal partners, maintenance activities, habitat types, and potentially-occurring special status species. Appendix A.1 contains the Vegetation Project Areas that combine sites into projects. Appendix B lists all sediment removal sites with detailed information including work footprints, types of equipment used, equipment location, and whether USACE jurisdiction is indicated. Regulatory agencies have requested that Appendices A and B also list larger District projects that, while not included in the Stream Maintenance Program (SMP), may also be performed within the Project Areas; these projects are listed but are noted as not being included in the SMP. Appendix C contains the maps of site locations and maintenance activities. Appendix D contains Site Fact Sheets for each site, which provides relevant site-specific information including habitats, likely special-status species, and appropriate Avoidance and Minimization Measures (AMMs) and Best Management Practices (BMPs). Appendix E contains the Biological Assessment and all its appendices. Appendix F contains the BMPs from the California Stormwater Quality Association (CASQA) and Fishery Network of the Central California Coast Counties (FishNet 4C). Appendix G contains the California Environmental Quality Act (CEQA) documents completed in support of the SMP. Appendix H contains the Pre-Work Biological Survey data sheet; Appendix I contains the fields of data collected during site assessment and maintenance; and Appendix J contains the Pre-Project Notification Form for Sediment Removal Sites. Appendix K lists the Site Specific Triggers that cause vegetation maintenance to occur for each site. Appendix L is the Large Wood Debris Management Plan Recommendations for Fairfax Creek at Sunnyside Flood Diversion and Storage (FDS) Facility.

1.4 Program Purpose and Objectives

Since 1972, the District has implemented a prescribed stream maintenance program based on best available science in order to maintain flood conveyance in District-maintained creeks and channels. The program is led by a creek naturalist who directs local conservation crews, road maintenance staff and private contractors to carry out environmentally sensitive vegetation management, sediment removal, and biotechnical slope stabilization activities along with the maintenance of pump stations, levees and other flood control facilities. District staff who implement the maintenance activities have expertise and training in natural resource management, sediment control, and erosion control measures. The SMP includes strong protections for wildlife, habitats, and water quality. As our understanding of the land has grown, the District has begun to explore and incorporate traditional Indigenous knowledge into maintaining watersheds. Based on research, California Native Americans managed trees, such as willows, and other plant growth in streams to have straight growth with minimal lateral branching. This growth pattern minimizes the hydraulic impact of plant growth on the flood carrying capacity. In addition, many plant populations require perturbations to rejuvenate. Perturbations include burning, grazing, digging, and other means (Anderson 2013). The District aims to

find a balance of disturbance to promote a healthy ecosystem, while maintaining the flood carrying capacity.

1.5 Summary of Maintenance Activities

The SMP manual defines the types and scope of the District's common maintenance activities conducted in and around flood control channels and facilities. It establishes programmatic guidance to conduct these activities for flood control purposes while avoiding and minimizing environmental and habitat impacts. The SMP manual provides the organizational framework for flood control staff and managers to oversee maintenance crews and their activities and to ensure that their work complies with the terms and conditions of regional, state, and federal regulations while ensuring the protection of special status species and wetland and riparian habitats. Summary of Maintenance Activities

The SMP includes five types of maintenance activities listed below. Detailed descriptions of each of these activities and the environmental protections that are incorporated into the implementation of these activities can be found in Chapters 3-9.

- Vegetation management in-stream
- In-stream sediment and debris removal
- Erosion control
- Facilities maintenance and repair of flood control structures in channels
- Levee maintenance like gopher control and drivable resurfacing

The District's SMP manual has been developed to define the maintenance of streams and flood control facilities, establish programmatic guidance to conduct maintenance activities, and to ensure that the program complies with the terms and conditions of its permits from regional, state, and federal agencies.

To minimize impacts to water quality, wildlife, and native habitat, the SMP specifies appropriate general and activity-specific conditions, sensitive species-specific avoidance and minimization measures (AMMs), and best management practices (BMPs) to be employed as part of program implementation (Chapter 3).

The SMP does not include projects requiring individual CWA Section 401 Certification or Waste Discharge Requirements, such as larger capital improvement projects (e.g., building a new pump station), large sediment removal projects (e.g., mainstem of Novato Creek), or new bank stabilization projects using rock rip-rap.

1.6 Program Areas, Project Areas, and Sites

The geographic extent of the SMP includes seven program areas: one each for six flood control zones and one County Service Area (Figure 1-1):

- Flood Control Zone 1 – Novato

- Flood Control Zone 3 – Richardson Bay
- Flood Control Zone 4 – Bel Aire and Strawberry Circle
- Flood Control Zone 5 – Stinson Beach
- Flood Control Zone 7 – Santa Venetia
- Flood Control Zone 9 – Ross Valley
- County Service Area 13 – Upper Lucas Valley

Each of the program areas are in suburban eastern Marin County, except for Flood Control Zone 5 which is located in Stinson Beach in West Marin (Figure 1-1). Within each program area, sections of creek(s) were combined to create project areas where vegetation maintenance occurred. Each project area includes portions of a creek, or several creeks that are connected (i.e., tributaries), where selective vegetation maintenance occurs. Project areas usually include areas with similar habitats and species. Vegetation maintenance occurs within select areas or a small portion of the project area, with most project areas maintaining less than 500 linear feet (LF) of vegetation maintenance. Three zones are also considered project areas, since the amount of vegetation that is maintained in each zone is minimal (usually less than 200 LF).

Each project area includes one or more sites. Sites go into more detail about the vegetation type, species present, whether they are tidally-influenced or not, and the section of creek the District maintains. The Biological Assessment goes into detail about the five different habitat types: California annual grassland, northern coastal salt marsh, diked baylands, north coast riparian forest/scrubland, and mixed evergreen forest. The list of sites and project areas can be found in Appendix A and Appendix A.1.

Maintenance work occurs on lands where the County and/or its municipal partners own the land outright in fee title or hold legal easements. The District is limited to certain activities based on the specific parcel easement. Usually, the activities are limited to fire fuel reduction and maintaining flow capacity for storm events. In some parcels with easements, the property owner continues to conduct other activities on the property. This may include mowing and removing vegetation. While the District strives to create a partnership with each landowner, this is not always possible and landowners can take counter measures to the District's efforts (e.g., mowing recently planted vegetation).

In a limited number of sites, vegetation or sediment maintenance activities may occur on private parcels for which the District and/or its municipal partners annually receive written landowner rights-to-enter permissions in order to perform maintenance activities (3-REED-1; 3-REED-2; 3-SUT-5; 4-EAST-2, 5-EAS-1, 5-EAS-2, 5-EAS-3, 7-GAL, 9-LAR-2, 9-MAG-1, 9-MAG-2, and 9-MAG-3). No aspect of the SMP will be implemented in areas where the County or its municipal partners do not have direct legal jurisdiction or landowner permission.

FLOOD CONTROL ZONE 1- NOVATO

Flood Control Zone 1 encompasses the 36,500-acre watershed tributary to Novato and Rush Creeks, which includes the entire city of Novato plus a large part of the

unincorporated area around the City. The zone was formed in 1970 to address flooding issues in downtown Novato and surrounding areas. Novato Creek is a substantial perennial stream that extends approximately 17 miles from its mouth at San Pablo Bay to its headwaters above Stafford Lake. Tributaries include Arroyo Avichi, Vineyard Creek, Warner Creek, and Wilson Creek. Ongoing maintenance includes regular servicing of four pump stations, trash racks, tidegates, levees, and drainages, and an annual vegetation maintenance program.

FLOOD CONTROL ZONE 3 – RICHARDSON BAY

Flood Control Zone 3 encompasses 8,535 acres in Southern Marin draining to Richardson Bay, including the City of Mill Valley and the unincorporated communities of Almonte, Alto, Homestead Valley, Sutton Manor, Tamalpais Valley, and portions of Strawberry Point. The zone was formed in 1956 to address vulnerability to flooding from creek and tidal action within the area adjacent to Richardson Bay. The zone includes Richardson Bay and the many drainage areas tributary to the Bay including Coyote Creek, Arroyo Corte Madera del Presidio, and Warner Canyon Creek. Maintenance activities include regular servicing of five pump stations, trash racks, tidegates, levees and drainage ditches, and an annual vegetation maintenance program.

FLOOD CONTROL ZONE 4 – BEL AIRE AND STRAWBERRY CIRCLE

Flood Control Zone 4 is located on the Tiburon Peninsula. It encompasses 550 acres and includes portions of the City of Tiburon and the unincorporated communities of Bel Aire and Strawberry. The zone was created in 1957 to alleviate chronic flooding in what was the Bel Aire subdivision and adjacent undeveloped lands. The boundaries of the zone were later amended to include the area of Strawberry Circle. The zone currently maintains existing facilities including three pump stations and performs an annual vegetation maintenance program.

FLOOD CONTROL ZONE 5 – STINSON BEACH

Flood Control Zone 5 encompasses 1,500 acres within the Easkoot Creek watershed. The zone was created in 1961 to address the flooding in Stinson Beach caused by overflows of Easkoot Creek, a small perennial stream that flows through the community into the southeastern arm of Bolinas Lagoon. The creek supports steelhead; coho (likely stragglers) have been documented in the lower reaches (see the Biological Assessment for more information); and California red-legged frogs have been documented in a small brackish pond on the east side of Highway 1 at the north end of the Bolinas Lagoon. Common maintenance activities include removal of sediment and debris jams at bridges and vegetation maintenance along the creek corridor.

FLOOD CONTROL ZONE 7 – SANTA VENETIA

Flood Control Zone 7 extends over approximately 260 acres in the unincorporated community of Santa Venetia, east of Highway 101 along N. San Pedro Road. This

community was one of the first developments in Marin County to be constructed on fill over bay mud and was built in an era before the County had the authority to regulate or control development. Due to the low initial elevation of the fill and the compressible nature of the underlying bay mud, the area has subsided and is now below the high tide level. To protect themselves from tidal flooding of Gallinas Creek, the residents of Santa Venetia formed Flood Control Zone 7 in 1962. Maintenance activities include regular servicing of five permanent and three portable pump stations, tide gates, levees and drainage ditches, and an annual vegetation maintenance program.

FLOOD CONTROL ZONE 9 – ROSS VALLEY

This large zone encompasses the 18,600-acre watershed drained by Corte Madera Creek and its tributaries. The towns of Fairfax, San Anselmo, Ross and Larkspur as well as the unincorporated communities of San Anselmo, Fairfax, Kentfield, and Greenbrae are located within this zone. Flood Control Zone 9 was established in 1966 to act as a sponsoring agency for the U.S. Army Corps of Engineers Corte Madera Creek Flood Control Project. In January 2007, the flood zone boundaries were amended to include all territories within the incorporated areas of the towns of San Anselmo and Fairfax. This change was undertaken in response to the flood of December 30, 2005 and the subsequent creation of the Ross Valley Flood Control and Watershed Program. The zone maintains the Corte Madera Creek flood control channel from just downstream of the Ross Post Office to the outfall of the creek in Larkspur. Typical maintenance activities include an annual vegetation and debris cleaning of the creeks and maintaining a new pump station at Granton Park in Kentfield, Ross Valley. The FDS Basin will be incorporated into the SMP in different stages. In 2025, the vegetation maintenance of the FDS site will be incorporated into the SMP. The vegetation maintenance will also include the large wood debris management plan. In 2028, the sediment removal portion of the FDS site will be incorporated into the SMP.

COUNTY SERVICE AREA 13 - UPPER LUCAS VALLEY

County Service Area 13 (Upper Lucas Valley) is located within the 5,950-acre Miller Creek watershed and is managed by Marin County Parks. Parks requested that the District's help in maintaining the flow capacity of the creek. Activities include vegetation maintenance, removal of non-native plant species, and re-vegetation with native species. Students and Teachers Restoring a Watershed (STRAW) is an important partner in this watershed.

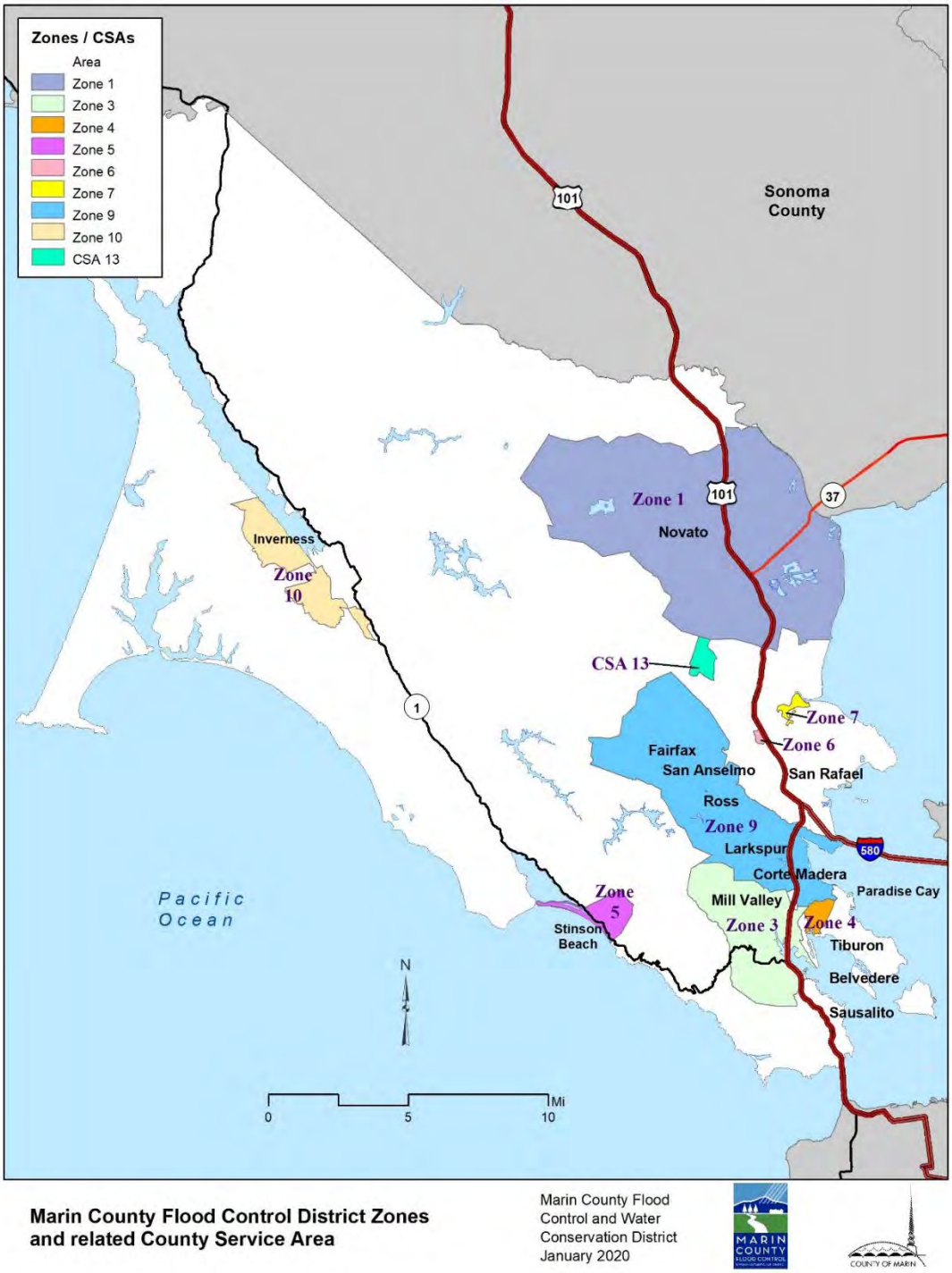


Figure 1-1. Areas with streams covered by the Marin County Flood Control District.

1.7 Responsible Parties and Program Partners

Marin County Flood Control and Water Conservation District

The District is the primary proponent for the SMP, which utilizes the labor and expertise of the County of Marin Department of Public Works flood control staff and road maintenance crews, Conservation Corps North Bay, STRAW, and private contractors to manage and implement prescribed maintenance activities.

The District will designate environmental staff who will provide day-to-day oversight of the SMP including: 1) project planning; 2) pre-project notifications to applicable resource agencies; 3) project implementation including scheduling appropriate site surveys and conducting crew trainings; and 4) annual reporting. The District will also designate Environmental Compliance Coordinators (ECC) to oversee the biological aspects of the SMP. The ECCs shall understand biological resources, missions of regulatory agencies and regulations as they may affect listed species, and knowledge of the nature of the maintenance activities. The ECCs will coordinate activities with input and review from Public Works biologists.

During project implementation, the ECCs will ensure that all precautions are taken to avoid impacts to the environment including adherence to general conditions and prohibitions as well as activity-specific conditions for each type of activity. The ECCs will also ensure that AMMs are employed as prescribed in Chapter 5, depending on the location and nature of the activity.

Department of Public Works Roads and Building Maintenance

DPW road maintenance crews perform vegetation management, sediment removal, and maintenance of tide gates and other facilities for the District. DPW building maintenance crews undertake pump station maintenance activities.

Conservation Corps North Bay

Conservation Corps North Bay (CCNB) is a non-profit job training and educational organization which has been operating in Marin County since 1982. CCNB will be the primary active partner and contractor with the District for many of the activities included in the SMP. CCNB Maintenance Supervisors and staff will be trained annually by District staff to incorporate the general and activity-specific conditions, AMMs, and BMPs required for each activity at each site to protect water quality, habitat, and special status species.

Marin County Parks

The District coordinates with Marin County Parks to perform vegetation maintenance activities on lands under their jurisdiction, including County Service Area 13 and the Santa Venetia Marsh Preserve.

Municipal Partners

In addition to the work it oversees directly, the District has formal Memoranda of Understanding with the cities of Larkspur, Mill Valley, and San Rafael and the towns of Fairfax, Ross, and San Anselmo to conduct channel maintenance activities on properties within their jurisdictions. Municipal partners are identified in Appendix A.

Students and Teachers Restoring a Watershed

The District partners with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP) and Point Blue Conservation Science's (formerly the Point Reyes Bird Observatory) Students and Teachers Restoring a Watershed (STRAW) Project to perform restoration work in eastern Marin County. Activities consist primarily of removal of invasive plants and planting of native species by groups of teachers and students organized by STRAW.

The STRAW Project provides an integrated program of classroom and hands-on watershed restoration education, centered on involving students in professionally designed, creek and wetland restoration to improve creek and wetland habitats. Restoration experiences are complemented with classroom and field studies throughout the school year. These educational activities create a meaningful context for the restoration work and a greater understanding of watershed ecology.

1.8 Foundation Documents for the SMP Manual

The SMP Manual is largely based on work previously performed by the Bay Area Stormwater Management Agencies Association (BASMAA). The District, as a member of MCSTOPPP, has been an active member of BASMAA since 1989. BASMAA is a consortium of 90 Bay Area county and city governments, local water and sanitation districts, and state agencies and was formed in response to the National Pollutant Discharge Elimination System (NPDES) permitting program to promote regional consistency.

In 1998, BASMAA formed an Operational Permit Committee which worked for several years to develop a Regional General Permit with the USACE to cover prescribed maintenance activities in flood control channels within BASMAA's jurisdictional areas. Although a Regional General Permit was not obtained, the Operational Permit Committee produced several documents which have been used by several BASMAA members to obtain individual permits. The District is also utilizing these documents to support programmatic permit applications for the SMP program, including:

- Minimal Threat Channel and Basin Maintenance Activities. October 2009. This document describes prescribed flood control maintenance activities.
- Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. October 2006. This document describes the environmental setting, special status species within the BASMAA jurisdictional area, the extent and scope of proposed activities, and a suite of AMMs and BMPs.

Additional supporting documents include the Biological Assessment of the proposed SMP (Appendix E) which identified possible sensitive species and habitats that could be impacted by the project and several sources for BMPs (Appendix F).

2.0 ENVIRONMENTAL SETTING AND PROJECT AREAS

2.1 Physical Description

Marin's watersheds share the same general anatomy: the ridge-tops and upper slopes of the watersheds are in generally undisturbed open areas, the valley floors are densely developed, and the lower reaches are tidally-influenced and quite flat.

The uplands encompass the hilly, often steep, terrain from the top of the ridges down to where the valleys flatten out. They are dominated by mixed evergreen forest and oak-bay woodlands, interspersed with open annual grasslands, chaparral, and coastal scrub. Much of the upland habitats in Marin County are protected as public and municipal open space.

The valley floors, where most of the District's SMP sites are located, contain dense residential and commercial developments, often located next to, and sometimes over the creek channels. The road network is also dense, with many bridges and culverts spanning the creeks. In many cases, urbanization has led to channel straightening, building structures that restrict flow and an expansion of invasive plant species.

Creeks on the valley floor are often incised and largely separated from their floodplains by urban land uses. Their channels are often narrower than would be expected given the size of their contributing watersheds. Urbanization has likely increased the timing and magnitude of peak runoff events such that more water flows to the creek at a quicker rate. This can lead to channel down cutting and bank hardening which reduces available riparian habitat.

The lower reaches of creeks have very little topographic relief and are either tidally influenced and support tidal marsh or are cut off from their surrounding marsh lands by levees. These areas often have altered hydrology and are constrained by roads, levees, and other development. Freshwater seasonal wetlands have become established in areas that were historically baylands and then subsequently diked for agriculture. These seasonal wetlands provide habitat for migratory waterfowl and shorebirds.

2.2 Geomorphic Setting

Urbanization has greatly impacted the transport and storage of sediment through Marin's creek systems. Over time, these reaches likely stored sediment in the channel, distributing and depositing it along alluvial fans and or channel floodplain surfaces. The historic geomorphic system was altered by land use practices and the resulting infrastructure developed in the 19th and 20th centuries. Grazing, agriculture, urbanization, road development, flood protection and other land use changes combined to alter the channel system and patterns of sediment deposition.

Many of the streams maintained by the District have been channelized and engineered for flood control purposes. Streams that previously migrated and deposited their sediment across a broad alluvial fan or floodplain are now constrained to linear channels where sediment accumulates.

Stream channel incision is another geomorphic legacy that affects many of the channels maintained by the District. Incising channels are actively eroding and down-cutting their channel bed and banks. There are several possible causes for channel incision including hydro-modification effects (due to land use changes) whereby runoff and stream flows are more erosive due to higher peak volumes and velocities. Sometimes channels incise because the "base" or "trunk" stream into which they flow has itself "sunk" or incised, and therefore the tributary follows this lead by incising to meet the elevation of the downstream receiving water. Alternatively, sometimes channels incise because there is an active "headward migrating knickpoint" that moves upstream through a system eroding and lowering the channel bed as it moves upstream Incised channels are typically at greater risk for bank destabilization and in need of repair.

Novato Creek Watershed

The Novato Creek watershed, located at the northwestern extent of San Pablo Bay, is the largest watershed in eastern Marin County. Its creeks flow eastward through oak and bay forests, grasslands, the City of Novato, and into San Pablo Bay near the mouth of the Petaluma River. Novato Creek is joined by six major tributaries along its 17 mile length: Leveroni, Bowman Canyon, Warner, Arroyo Avichi, Arroyo de San Jose, and Simmonds Slough.

The channel network has been altered from its historic natural conditions. Many of the channels are actively in transition to a more stable configuration with the majority of the channels narrower than expected for the watershed size and rainfall. Urbanization has likely increased the timing and magnitude of peak runoff events such that more water flows to the creek at a quicker rate.

Extensive bank erosion indicates that the channels are in a widening phase. Sediment production in the watershed occurs due to upslope processes such as landslides and gully development, as well as channel bed incision and bank erosion. The Novato Creek mainstem of Novato Creek and its major tributaries are all highly entrenched within the city limits and are constrained by development on the banks. Channels in the upper watershed are still incising and are expanding headward into hillside swales.

The stream channels in the lower reaches of the watershed are managed for flood conveyance and navigation and their ability to transport sediment is reduced by levees and urbanization. The levees limit the tidal prism available to scour and move sediment. Sediment accumulates in the lower reaches of the mainstem creek where levees have cut off the channel's access to the marsh lands.

Richardson Bay Watersheds

The Stream Maintenance Program area in Southern Marin County contains several sub-watersheds that drain into Richardson Bay including Arroyo Corte Madera del Presidio and

its tributaries (Cascade, Old Mill, Reed and Warner Creeks), Coyote Creek, Ryan Creek, Marin City and Bel Aire (West and East Creek).

Arroyo Corte Madera del Presidio drains the ridges of the eastern slope of Mount Tamalpais and the Corte Madera Ridge as they flow eastward to Richardson Bay through the Town of Mill Valley. The upper slopes and ridges are largely owned by Marin County Open Space, Marin Municipal Water District, and state and federal park agencies; these lands provide habitat connectivity between adjoining watersheds. The upper channels are steep with boulders and bedrock cascades as they flow through forested v-shaped valleys. Urbanization has altered the form and habitat function of the creeks in the middle and lower reaches of the watershed. Mill Valley land use is mostly medium to low density residential with clusters of commercial areas on the valley floors. Concrete and rock bank stabilization is found throughout much of Arroyo Corte Madera del Presidio and its tributaries; Old Mill Creek, Warner Creek, and Reed Creek. Sections of these creeks have been concrete lined and put into culverts under roads and buildings. Pools are limited to shallow scour pools associated with bank erosion or debris (Rich 1995, and Reedy 2005). Arroyo Corte Madera del Presidio transitions to a tidal slough downstream of La Goma Street.

The Coyote Creek watershed is bounded by Bothin Marsh and Richardson Bay to the east and the Arroyo Corte Madera del Presidio subwatershed to the north. The ridges to the south and west are protected as part of the Golden Gate National Recreation Area. The Coyote Creek subwatershed includes the unincorporated communities of Tamalpais Valley, Tamalpais Valley Junction (Tam Junction), Manzanita, and Almonte. Most of the development is single-family residential, with limited commercial development and services. The upper watershed is mostly rural and semi-rural, while the lower watershed is developed with greater densities near Bothin Marsh. Commercial development is largely concentrated in a small area at the junction of Highway 1 and Almonte Road.

Ryan Creek watershed, only 0.31 square miles lies immediately to the north and east of Arroyo Corte Madera del Presidio watershed. Ryan Creek is ephemeral in nature and water only flows in the creek during and immediately after storm events. Marin City watershed, just to the south of Coyote Creek covers 0.64 square miles and has both have a mix of residential and commercial areas. The upper hillsides are almost entirely residential and there is a substantial houseboat residential area at along the bay front. The Bel Aire, located on the Tiburon Peninsula on the northeastern shores of Richardson Bay, measures 0.78 square miles in area. Three pump stations and annual clearing of vegetation from channels, helps to decrease risk of flooding in this low-lying area of Southern Marin.

Easkoot Creek Watershed

Easkoot Creek originates in the steep, west-facing slopes of Bolinas Ridge. Three tributaries (Fitzhenry, Laurel, and Black Rock Creeks), join to form Easkoot Creek just upstream of Shoreline Highway in Stinson Beach. After exiting the uplands, the creek turns northwest and flows behind the coastal dune until it enters the south arm of Bolinas Lagoon. It has been debated whether the creek historically flowed to the Lagoon or went straight out to

the ocean. Recent research indicates that the current channel location very closely matches its historic location, and that only during high flow events would the creek change its course and flow directly to the ocean across the beach (Van Kirk 2002, Tetra Tech 2001).

The stretch of Easkoot Creek through the town of Stinson Beach has been hardened with riprap, sacrete, gabions, or retaining walls to stabilize its banks. This reach of creek also exhibited markedly low amounts of large wood and no viable pools.

During medium to large storm events, an active slide on Mt. Tam releases enough hillside material to fill in the creek, even if it has recently been dredged. The essentially flat reach from Arenal to Bolinas Lagoon creates a slower moving creek and a natural area for sediment to settle and deposit. The private bridges along the residential streets known collectively as the "Calles" have limited to no clearance from the creek during storms, which may contribute to flooding. The County and Flood Control Zone 5 has spent significant funds to perform limited sediment removal at the Calle bridges that is typically effective for only one to two seasons and requires dewatering the channel and relocating Steelhead trout. A sediment basin on Park Service property, downstream of Arenal Avenue, has been constructed to capture sediment in one location to the reduce the frequency of sediment removal at the Calles bridges, thus reducing impacts to Steelhead and other aquatic life. Constructed in 2013, annual monitoring has shown that it is working well and its effectiveness in capturing sediment has allowed for a decrease of sediment removal at the six bridge crossings, thus avoiding impacts in more sensitive creek habitat.

Gallinas Creek Watershed

The Gallinas Creek watershed is in east Marin between the Miller Creek and San Rafael Creek watersheds. The North Fork is the larger of the two drainages and flows from the Terra Linda/Sleepy Hollow ridgeline through Santa Margarita Valley and the community of Terra Linda to its confluence with South Gallinas Slough near McInnis Park. South Gallinas Slough is fed by several small tributaries that originate in the San Rafael Hills and San Pedro Ridge and flow through the highly urbanized communities of San Rafael Meadows and Santa Venetia.

Prior to urbanization and the tidal wetland reclamation practices of the early 1900s, Gallinas Creek had an extensive tidal slough system fed by intermittent streams originating above Santa Margarita Valley and the headlands surrounding South Gallinas slough. By the 1920s, levees around Santa Venetia had already been constructed, and since the 1940s, the main tidal sloughs were leveed and the smaller channels and interior tidal marshes drained and filled for agriculture, creating the channel configuration present today.

During the construction of the Terra Linda housing development in the 1950s, upper sections of Gallinas Creek and its tributaries were channelized along Del Ganado Road and Freitas Parkway, following the historic creek alignment. Although the creeks that drain the southern portion of the Gallinas watershed still have natural creek bottoms many have been engineered and realigned and their banks heavily armored.

Corte Madera Creek Watershed/Ross Valley Watershed

The Corte Madera watershed includes 44 miles of stream channels. Ross Creek drains the northern slope of Mt. Tamalpais; San Anselmo Creek and its tributaries drain the northwestern portion of the watershed. The two channels join to form Corte Madera Creek, which continues through more than a mile of concrete-lined channel past the confluences of Larkspur and Tamalpais Creeks and into the salt marsh at the mouth.

Corte Madera Creek and its tributaries responded to the intensive timber harvesting and livestock grazing of the 1800s by incising into the Holocene valley fill. Large trees growing within the channel banks are approximately 50 years old and were likely established immediately after the 1955 flood, which formed high gravel bars. Although the channels are still responding to the 1800s land use and subsequent urbanization, the effects are slowing and less dramatic. As stated by Stetson (2000), ongoing channel responses include headward advance of 1st order tributaries, reduced bed incision and bank erosion in the upper alluvial channel network and slowing of channel aggradation in the lower reaches of the watershed.

Exposed bedrock outcrops and constructed grade-control structures throughout the channel network have slowed channel incision while accelerating channel widening. Nearly 50% of the banks have been stabilized with rock or concrete to stabilize banks. Geomorphic recovery processes are ongoing, with inset floodplains occurring in areas where the channel was not restricted from widening and pool/riffle sequences forming in the stable bed. Dense urbanization up to the top of streambanks and unnaturally narrow channels restrict instream habitat recovery and limit channel capacity.

The tidal reaches of the system are heavily impacted and have been modified for flood management. In the 1960s, the Army Corps of Engineers designed and constructed an earthen trapezoidal channel on the lower 4.5 miles of creek through the towns of Corte Madera, Larkspur, Kentfield, and Ross. Lower Corte Madera Creek has been widened and straightened. These lower reaches are sediment aggradation and storage zones for upland and tidally-derived sediment.

Sediment is delivered to the channels from upland sources such as gully development, overland flow, and landslides, as well as from channel bed and bank erosion. It is estimated that the latter accounts for only 9% of the annual bedload transported in the system, while the upland sources account for 91% (Stetson 2000). Together the San Anselmo Creek and Sleepy Hollow Creek subwatersheds generate 55% of the total annual bedload, while Ross Creek and Fairfax Creek subwatersheds only generate about 10% of the bedload each. These differences are due to variations in geology, topography, vegetation types, and land use.

Miller Creek Watershed

Miller Creek and its tributaries drain a 7,440-acre watershed. Historically, the mainstem channel did not extend all the way to San Pablo Bay. It apparently dissipated most years

into a willow grove and wetland complex just south of the present location of St. Vincent's School

Miller Creek and its tributaries have been significantly altered by land use practices since Euro-American contact. Heavy cattle grazing, the conversion from native perennial to non-native annual grasslands, urbanization, ditching and the construction of storm drains have all increased the amount and depth of runoff during storms. The increased runoff has caused channels in the upper watershed and in the upstream reaches of the valleys to incise, leading to local bank failure and loss of riparian vegetation. The eroded sediments have accumulated upstream of some bridges and culverts that act like sediment dams, and along the lower limits of the mainstem channel near the baylands. The accumulation of sediment in the mainstem channel has raised its bed and increased the risk of flooding. Flood control levees have been added in some places.

Miller Creek's drainage network consists of a mainstem channel and its tributaries. The lower reaches downstream of Lucas Valley Estates are perennial, while upstream reaches are intermittent or ephemeral. The headwater reaches are largely ephemeral. Mainstem Miller Creek supports a small but viable steelhead fishery.

2.3 Biological Resources

The District prepared a Biological Assessment (BA; Appendix E) of the project area to evaluate the potential for the occurrence of special-status species or sensitive vegetation communities within the project area (See Appendix E). Most of the vegetation maintenance and sediment removal work occurs in eastern Marin creeks draining from Novato Creek in the north to Coyote Creek in the south. There are only three project sites in western Marin County on Easkoot Creek in Stinson Beach (Zone 5), draining to the Pacific Ocean. Most of the maintenance activities occur within urbanized, residential, and commercial land uses. Some of the lower reaches include tidally-influenced land preserved for wildlife and flood control purposes. Most of the land in the upper reaches is largely undeveloped open space or grazing lands.

Vegetation communities present within and adjacent to the project area include California annual grassland, northern coastal salt marsh, diked baylands, north coast riparian scrub/forest, and mixed evergreen forest.

2.4 Special Status Plant and Wildlife Species

A list of special status plant and wildlife species that could potentially occur at the proposed SMP project sites was created. The list is based on biological resources within five USGS quads (Bolinas, Petaluma Point, Novato, San Rafael, and San Quentin), literature and database reviews, and familiarity with the biological resources within the project region. Altogether, the BA identified 113 species, of which 41 are listed or candidates for listing, and 72 are federal or state species of concern (see Appendix A in the Biological Assessment for the list of Special Status Species Reported or Potentially Occurring at the Project Sites).

For plants, there are 12 listed species in the selected USGS quadrangles and 21 species of concern. Based on the data available, none of the listed species and four of the species of concern is likely or somewhat likely to occur in the project sites.

Similarly, for animals, there are 29 listed species in the selected quads and 46 species of concern. Based on the data available, eight of the listed species and six of the species of concern are likely or somewhat likely to occur in the project sites.

The following special status species may possibly be found at sites where maintenance activities occur: Point Reyes bird's beak (*Cordylanthus maritimus spp. palustris*), hayfield tarweed (*Hemizonia congesta spp. congesta*), marsh microseris (*Microseris paludosa*), Marin knotweed (*Polygonum marinense*), Coho salmon (*Oncorhynchus kisutch*), steelhead trout, California red-legged frog *(Rana draytonii*), northwestern pond turtle (*Actinemuys marmorata*), California Ridgway's rail, California black rail (*Laterallus jamaicensis coturniculus*), northern spotted owl (*Strix occidentalis caurina*), salt marsh harvest mouse, and several bat species.

The BA documented vegetation communities present within or adjacent to work sites include California annual grassland, northern coastal salt marsh, north coast riparian scrub/forest, and mixed evergreen forest.

Stream Maintenance Manual Sections that Address Special Status Species Protection

The BA recommends several actions for avoiding and minimizing impacts on biological resources and special status species and these recommendations have been incorporated into the SMP, including:

- Work within recognized species work windows.

- Adhere to a list of species-specific Avoidance and Minimization Measures. Numerous AMMs to protect special status species and their habitat were identified within the Biological Assessment completed for this program. These AMMs have been incorporated into the SMP and can be found in Chapter 3.6 Avoidance and Minimization Measures for Fish.

- Best Management Practices (BMPs) from the FishNet 4C Manual: County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries (2004) were incorporated into the SMP manual and are applied in the field as standard operations. FishNet 4C is a multi-county program on the Central California Coast which helped Coastal Counties implement salmon protection and restoration efforts. The FishNet 4C Roads Manual was developed to assist County maintenance crews conduct their work in the most sensitive manner as possible to protect anadromous salmonid fish.

- Fact sheets for each individual project site were developed for the SMP and can be found in Appendix D. The fact sheets note whether salmonids presence is presumed

and list appropriate AMMs and BMPs to be employed at each site to protect and enhance salmonid habitat.

- Designate Environmental Compliance Coordinators (ECCs) to provide natural resource expertise to the SMP.

- Training of Conservation Crews and County maintenance workers on AMMs and BMPs to be applied in the field during all operations and during crew training sessions.

2.5 Salmonid Conservation

Within the project areas, steelhead trout are known to occur in Novato, Vineyard, Miller, Corte Madera, San Anselmo, Fairfax, Sleepy Hollow, Ross, Arroyo Corte Madera del Presidio, Warner Canyon, Old Mill, Reed, and Easkoot Creeks in Marin County, however current abundance is thought to be a small fraction of historical levels. Historically, coho salmon occupied the Arroyo Corte Madera del Presidio and the Ross Valley Watersheds, but there are no current runs into San Francisco Bay. In the Western Marin project area, coho salmon have been observed in the lower reaches of Easkoot Creek, but those observations were made in 2002 and were likely strays from adjacent coastal watersheds. Easkoot Creek is not known to support a run of coho salmon. Chinook salmon (*Oncorhynchus tshawytscha*) has been observed sporadically in lower Novato Creek watershed.

Marin County Department of Public Works maintains a salmonid presence stream layer in GIS format. The layer has attribute data for stream hydrograph (natural stream, ditch, embankment, artificial path), channel type (natural, engineered, pipeline), and documented presence of steelhead, coho, and Chinook. Because the County has never been exhaustively surveyed for salmonids, data for presence is not complete for the County, nor is there a consistent base year. The data are often used to denote historic presence. The salmonid presence layer is used for development planning countywide however the layer does not contain fine scale data, such as on spawning areas or migration corridors. Written reports from California Department of Fish and Wildlife (CDFW) habitat surveys note these types of fine scale habitat features such as pools and riffles, but CDFW does not provide these data in GIS formats.



Figure 2-1. Anadromous streams within the project areas (Marin County GIS) and fish passage barriers identified by Ross Taylor and Associates (2003).

Table 2-1. SMP sites located on or near anadromous streams.

Program Area	Project Area (Veg)	Site	Creek
Zone 1	Novato Creek	1-NOV-1	Novato Creek
Zone 1	Upper Novato Creek Area	1-NOV-2	Novato Creek
Zone 1	Upper Novato Creek Area	1-NOV-3	Novato Creek
Zone 1	Novato Creek Tributaries	1-VIN	Vineyard Creek
Zone 1	Novato Creek Tributaries	1-WAR-1	Warner Creek
Zone 1	Novato Creek Tributaries	1-WAR-2	Warner Creek
Zone 3	Zone 3	3-REED-1	Reed Creek
Zone 5	Zone 5	5-EAS-1	Easkoot Creek
Zone 5	Zone 5	5-EAS-2	Easkoot Creek
Zone 5	Zone 5	5-EAS-3	Easkoot Creek
Zone 9	-	9-CMC-1	Corte Madera Creek
Zone 9	Lower Corte Madera Creek Complex	9-CMC-2	Corte Madera Creek
Zone 9	Lower Corte Madera Creek Complex	9-CMC-3	Corte Madera Creek
Zone 9	Fairfax Creek	9-FAIR	Fairfax Creek
Zone 9	-	9-LAR-2	Larkspur Creek
Zone 9	Upper Corte Madera Creek Complex	9-SHC-2	Sleepy Hollow Creek
Zone 9	-	9-SHC-4	Sleepy Hollow Creek
Zone 9	-	9-SHC-5	Sleepy Hollow Creek
Zone 9	-	9-SHC-6	Sleepy Hollow Creek
CSA 13	CSA 13	CSA-13-MC	Miller Creek

Over-Arching Principles for Protecting and Enhancing Salmonid Habitat

Marin County Flood Control District has decades of experience working in or near streams that support populations of threatened or endangered salmonids and their habitat. In 1998, Marin County initiated the FishNet 4C program, a multi-County program designed to help County governments develop programs and protocols for protection of listed salmonids and their habitat. In 2004 the County adopted the FishNet 4C County Road Maintenance Manual: Guidelines for Protecting Aquatic Habitat and Salmon Fisheries. Since then, the County has conducted semi-annual trainings on the content of the manual.

Best Management Practices spelled out in the manual are routinely implemented in the field during maintenance activities and are referenced in this manual as well.

When working in or near salmonid streams, the following management strategies will be applied wherever possible:

1) **Maintain Low-Flow Channel**: During sediment removal activities the District will provide low flow channels for habitat and fish passage wherever feasible. The District does construct a low flow channel on larger sediment removal projects not included in this manual. On perennial streams, a low flow channel will be established if the County has available the right of way to perform the work.

2) **Maintain Vegetation on Lower Streambanks**: Manage stream side vegetation to support aquatic life and salmonids by maintaining overhanging vegetation above and next to the water surface. Vegetation trimming will target mid to upper limbs to allow for debris passage. Thus, the roughness is controlled nearer the top of the cross-section rather than at the bottom where the critical functions of the plants, as habitat are, most needed.

3) **Maintain and Enhance Instream Habitat Complexity**: A complex instream and channel bed environment provides habitat heterogeneity, cover, and refugia during a range of flow conditions. In coordination with other maintenance activities, District managers will evaluate channels and maintenance sites for opportunities to maintain or enhance complex habitat features. Examples of instream complexity features include:
    - Overhanging vegetation
    - Undercut banks
    - Large Woody Debris features that provide cover and refugia during high flow events as well as channel diversity in lower flow events.
    - Deep channel pools that provide rearing habitat and refugia during high flow events as well as habitat during extreme low water times.
    - Cobble/gravel bars and benches that provide spawning and rearing habitats for fish, refugia during higher flow events, and areas suitable for good invertebrate drift.
    - Instream geomorphic features that increase channel bedforms, increase the range of channel velocities, and increase the overall range of habitat conditions.

4) **Management of Large Woody Debris (LWD):** Under District guidelines, large woody debris (LWD) is defined as stumps (alive or dead), root-wads, or logs having a minimum diameter of 12 inches and a length of 10 feet or longer. Typically, LWD left in place would be a hardwood (e.g., oak, redwood), as softwoods (e.g., alder) tend to float and/or rot quickly. Hardwood LWD creates essential habitat for salmonids, including pools and shelter from predators, which are required at specific life stages. To the greatest extent possible, the District will work to preserve

and protect LWD on salmon streams (see Table 2-1). When LWD is encountered in salmon stream channels during pre-project assessment, the following management practices should be enacted:

- All large wood in the channel will be inspected during pre-project surveys. If there is doubt about how to manage the LWD, a CDFW biologist should be consulted.

- Removal of LWD on salmon streams (as opposed to modification) should only occur where accumulation of woody debris poses a threat to road stability, culverts, bridges or other instream structures and could cause potential flooding due to diminished channel capacity. See LWD Management Decision Tree below.

- Whenever possible the District will preserve enough roots and branches on the downed wood to provide complexity needed for habitat or reposition the wood intact.

- When modifying log jams, the District will leave logs, root-wads and stumps in the longest lengths and diameters practicable for removal and hauling. Off logs must be cut from fallen trees leave as much as possible on the main trunk, and attached to the root-wad if possible. Only branches obstructing flow should be cut.

- Whenever possible and depending on the species of wood, the District will incorporate LWD removed from channels into stream restoration projects at a nearby location and/or transport any removed LWD to the County Corporation Yard for storage for future restoration projects.

- During the pre-project notification, each site with chronic and recurring removal of LWD shall be assessed for potential adjustment to the maintenance activities or inclusion in the CIP (Capital Improvement Program) program, in order to achieve a more permanent solution to the problem.

If a particular LWD is not well-anchored (naturally or through modification), a buoyancy calculation is conducted:

$$\mathbf{F}b = \boldsymbol{p}\mathrm{f}.\mathbf{a}g.\mathbf{V}s$$

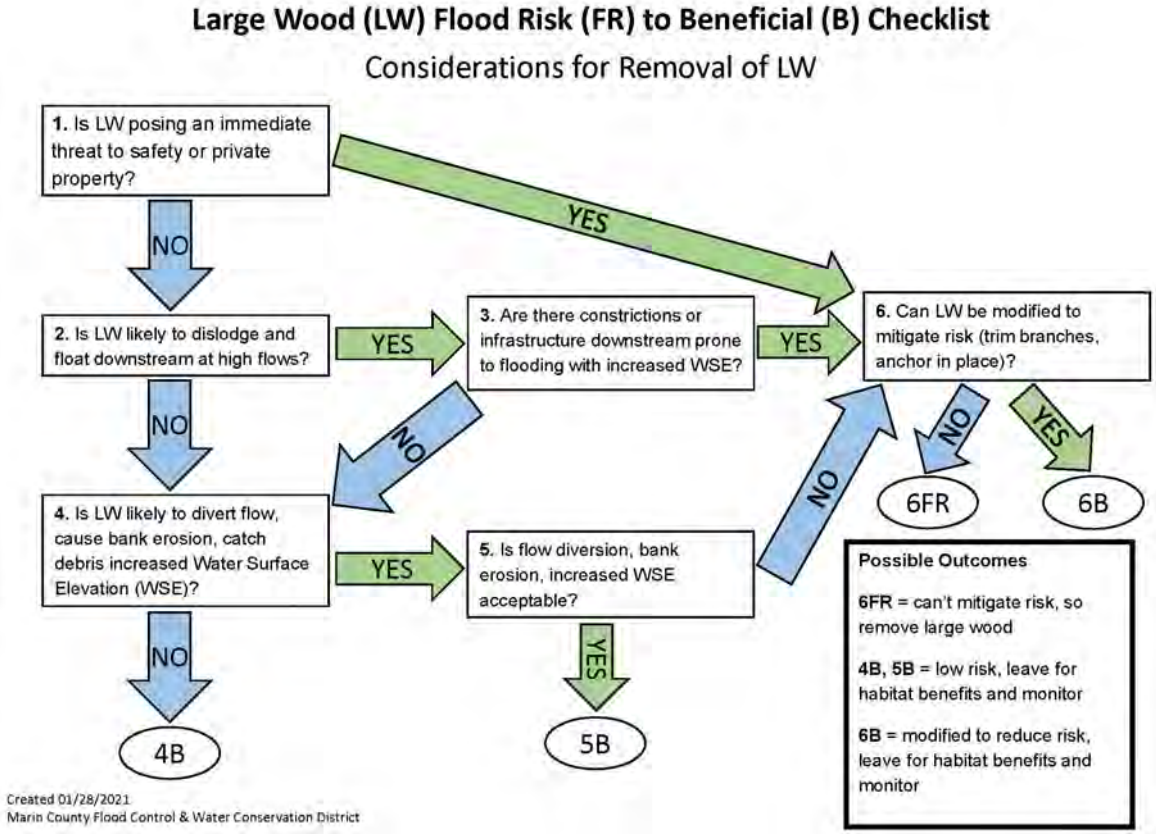
Where **F** is the buoyant force, **p** is the density of fluid (62.4 lbs/ft^3), *g* is the gravitation acceleration, and **V** is the volume of the fluid displaced.

The District typically only does maintenance work where there is a history of and high risk for flooding. These are portions of creek that tend to have been developed very close to

the top of bank and within the floodplain (the District has no authority over development). Bank erosion and flash flooding threaten nearby structures, making them unforgiving systems in which to experiment with leaving LWD in place.

A site where we sometimes do have the opportunity to preserve LWD is a reach of 1-NOV-3 where the Novato Creek Flood Control Phase VIII project was constructed in 2006. The Phase VIII project was designed to stabilize creekbanks through the (less than 1-mile) reach, lay back banks to keep a 50-year design flow within the banks, and improve habitat and reduce erosion through native plantings and placement of rock J-vanes. The J-vanes concentrate flows to the middle of the creek, reducing erosive forces on the bank, and encourage scouring of pools. Native sedges, trees and other vegetation was planted to improve the habitat around the pools. Mature native trees were preserved and generate LWD within the reach. Often the LWD has (or has potential with modification) hydraulic and habitat effects consistent with the rock vanes and vegetation that were incorporated or preserved as part of the original design. Each year, when LWD is discovered in this reach, a memo will be provided with the annual notification to agencies, or with the annual report if the tree or branch falls after May 1.

Following is a LWD management decision tree that outlines the process of evaluating LWD.



Maintenance crews will record the code of outcomes for LWD encountered in creek assessments (e.g., 6FR, 4B, etc.), including explaining the justification for the code. Documentation of the inventory of target-size large wood pieces identified and piece size reduction work performed during each maintenance work session (preproject annual dry season, and as-need post-storm wet season) will be included in the annual SMP report.

San Anselmo Flood Risk Reduction Project Flood Detention and Storage Basin has other considerations around LWD management. See Appendix L for Large Woody Debris Plan specific to this facility. At this time LWD management in site 9-FAIR is in the process of getting permitted through the San Anselmo Flood Risk Reduction project rather than the SMP. In the future, 9-FAIR will be incorporated into the SMP permits.

3.0 SELF MITIGATING APPROACH OF PROGRAM

This chapter describes how the implementation of the SMP ensures that maintenance projects are conducted in an environmentally sensitive manner and that impacts are avoided and minimized to the maximum extent possible. Each site has been coded as to the sensitive species potential and sensitive habitats, and for each sensitive species, Avoidance and Minimization Measures (AMMs) have been identified. Further, general conditions and BMPs have been identified for each maintenance activity. Taken together, these efforts assure protections for sensitive species and habitats within the maintenance project sites.

3.1 Mitigation Strategies

The SMP is structured such that its activities are temporal in nature and cause the least amount of disturbance. The District has worked for years to improve canopy cover in feasible areas and has taken a minimal approach to maintain that canopy cover and native vegetation. Permanent impacts will be avoided unless they are minor in nature and include things such as an increase in the size of a culvert. Where feasible, canopy forming trees will be planted. As stated in Section 1.6, the District works on lands that are owned by the District and on easements with many different property owners. Each easement has specific language which dictates the work the District may do on that specific parcel, many of which only include maintenance of a waterway to keep it clear for the free and natural flow and do not include planting. Sometimes the District can work with property owners to allow planting on that specific easement, but that is usually associated with a specific project and is conducted on a case-by-case basis. In addition, many easements only include the channel and not the upland or floodplain area where planting canopy trees would occur. Planting trees in the channel could impede water flow and cause flooding, so no trees will be planted within the channel itself. In easements that do include upland areas, development (such as buildings and other infrastructure) limit where trees can be planted. Many of the parcels that the District owns are in marsh or wetland habitat, where planting canopy forming trees would change the habitat and would have the potential to impact listed species. Therefore, canopy forming trees will not be planted in any marshes or wetlands.

An Initial Study for West Marin, pursuant to CEQA, was completed September 2007, and a Notice of Determination for a Negative Declaration was filed on October 22, 2007 (State Clearinghouse No. 2007-092065). An Initial Study for East Marin, pursuant to CEQA, was completed February 14, 2012, and a Notice of Determination for a Negative Declaration was filed on June 6, 2012 (State Clearinghouse No. 2012-022053). Mitigation measures were outlined in the Initial Study to address the temporary impacts associated with the maintenance activities included in this manual. Maintenance activities included in the SMP do not have significant permanent impacts to the creek channel.

The SMP's extensive species-specific Avoidance and Minimization Measures, General and Activity-Specific Conditions, and specified Best Management Practices limit the program's impacts. Temporary impacts from stream maintenance activities are avoided or minimized

utilizing the measures described above. In addition, environmental enhancements such as native willow staking, planting of native riparian vegetation, removal of trash and removal of non-native and invasive plant species are carried out as part of the course of work, and temporary impacts are typically self-mitigated by these actions. Temporary impacts will be mitigated at a 1.1:1 ratio.

Where specific mitigation actions are indicated for temporary impacts, the first course of action should be to attempt to mitigate onsite where impacts occur, with “like for like”; i.e., if riparian vegetation is removed completely, the mitigation would be to plant riparian vegetation locally where applicable. Where onsite mitigation is not available or feasible, the second choice of action should be to mitigate at another County location within the watershed or program area. Where neither of the above two courses of action is available or feasible, mitigation would occur offsite, such as at a STRAW site in the same or adjoining watershed.

3.2 Mitigation for Impacts to Anadromous Salmonids

In streams that support salmon or steelhead, impacts to waters of the U.S. or Waters of the State, and/or impacts to riparian habitat, would be mitigated by actions that benefit anadromous salmonids. Mitigation for the loss of instream complexity features will be determined by site assessments conducted prior to project implementation. The site assessments will also be conducted prior to sediment removal and bank stabilization projects to determine the presence and extent of coarse substrate and instream complexity features. This assessment will inform project and mitigation planning and design.

3.3 Proposed Mitigations by Activity Type

Vegetation Management
Most of the District’s vegetation management consists of limbing and trimming of trees and shrubs to maintain the bankfull flow. This select trimming helps maintain shading from the remaining canopy, stabilizes the banks with roots of the remaining trees and shrubs, and maintains understory plants. Therefore, these impacts are minor temporary. On rare occasions, mature trees are removed and would be considered a permanent impact.

In addition, the related activities of trash removal, non-native plant removal, planting native species, and/or leaving LWD in the creeks will mitigate for any temporary impacts caused by normal vegetation management. If tree removal is indicated, each tree more than 6-inches diameter at breast height (DBH) will be replaced with a minimum of three (3) native trees. Replacement trees will be planted within one year of removal (e.g., if the tree is cut down in July of 2022, replacement trees will be planted by July of 2023). Replacement trees will be monitored for five (5) years. If the survival rate is less than 80% after five years, replanting and additional monitoring to achieve the survival rate will be required.

Sediment and Debris Removal

The sediment removal projects covered by this SMP are small in scale and do not typically result in permanent impacts. Channel function is often improved after accumulated sediment is removed. Salmonid passage and migratory routes for other aquatic species are often impeded by culverts which become clogged to the point where these species cannot pass up or downstream through the channel. Typically, sediment removal from outfalls into tidal areas results in improved tidal flow and action benefitting upstream marsh vegetation. Additionally, sediment removal from clogged culverts will help to keep them in good working order and minimize catastrophic failure, which brings with it far greater environmental impacts.

Non-native plant removal, planting native species, trash removal, and/or modification of LWD instead of removal, serves to mitigate for temporary impacts caused by normal sediment removal activities. The District's first priority in disposing of sediments is to re-use them on other District properties. Often, sediments can be re-used within the same watershed. Uses include adding height to levees to bring levee up to original height and no higher, adding to levee slopes, and road maintenance. Other uses include wetland restoration, mitigation for sea level rise in transition zones and instream gravel use in restoration projects such as fish passage.

Erosion control

No specific erosion control projects have been identified at this time. If an erosion control project comes up, the project will most likely be self-mitigating and utilize biotechnical bank stabilization techniques. District erosion control projects have a goal of reducing suspended sediment in the waterway, through such things as installing native plants/seeds that stabilize stream bank soil. All proposed projects will be explained in the pre-notification report to the regulatory agencies.

Facilities Maintenance and Repair of Flood Control Structures

Facilities maintenance activities, conducted using best management practices, will generally have no permanent impacts and only minor temporary impacts. Trash removal and non-native plant removal next to facilities will provide mitigation for any temporary impacts caused by facilities maintenance activities. Regular facilities maintenance in creeks and wetlands is generally limited to cleaning, maintaining, and repairing flow gates (flap gates, rubber check valves, etc.) without the use of construction equipment in creeks. Special cases include (1) the occasional need to trim cattails in front of Lynwood Pump (1-LYS) station to facilitate preventive maintenance access and (2) managing cattails within the pond at the intake of Santa Venetia Pump Station 4 (7-PS-2). In the case of Pump Station 4, there is not enough pumping capacity to meet flood protection goals, so every bit of potential flood storage in this pond is critical.

Permanent impacts may occur when culverts or other structures (e.g., trash racks) need to be replaced and would require a larger size to allow for increased capacity. When this occurs, mitigation would occur on a 3:1 ratio and would generally includes creating new habitat or planting native plants.

Levee and Road Access Maintenance
Levee maintenance activities, conducted using best management practices, will have no permanent and very minor temporal impacts. Typical enhancement consists of the removal of non-native plant species which are removed for access and inspection purposes, in addition to trash removal.

3.4 Avoidance and Minimization Measures In General

General Avoidance and Minimization Measures (GAMMs) are included in the manual which apply to all sites. Avoidance and Minimization Measures per species (AMMs) were developed for this program based on the findings and recommendations in the Biological Assessment completed for this program. GAMMs and AMMs are described in detail in the following section.

General AMMs Applied to All Projects

Avoidance and Minimization Measures apply to all projects at all sites, regardless of maintenance activity type or type of special status species that may be present.

GAMM-1: Environmental Compliance Coordinator, Buffers and Work Stoppages

- Before commencement of a maintenance activity, The District shall designate an Environmental Compliance Coordinator (ECC). The ECC will be trained by a qualified biologist every year on species that could be present, how to identify potential species, updates to environmental laws, and updates on protection measures. The ECC will determine the appropriate AMMs to implement during operations, based on the site fact sheets and any new updates from the qualified biologist.

- The ECC shall distribute a work order to maintenance staff and contractors with a list of the AMMs and BMPs applicable to each site. The work order must be completed in a timely manner to allow time for pre-construction surveys by a qualified biologist or a trained ECC.

- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall establish buffers areas, if sufficient, or stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e., USFWS, NMFS, USACE, and/or CDFW). The ECC shall coordinate with Maintenance Supervisors to stop any activity the ECC or agencies deems may cause take of a listed species or their habitat. Work shall not be allowed to resume until appropriate corrective measures have been completed.

- All on-site maintenance activity personnel shall receive instruction regarding the presence of listed species and the importance of avoiding impacts to these species and their habitat before the start of work.

GAMM-2: Site Preparation/Wildlife Reconnaissance

The ECC shall walk the site each day before maintenance activities commence to locate wildlife; if any special status wildlife species are noted, work will not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

When maintenance activities require dewatering, a qualified fisheries biologist with appropriate permits shall be on-site to move fish.

All habitat improvements on salmon and steelhead streams shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (CDFW 2010).

GAMM-3: Work Windows

To avoid impacts to special status species, the maintenance activities carried out shall typically occur during the summer low flow season. In addition, species-specific work windows shall be followed to avoid impacts. Table below shows the work windows for species that may be impacted by the proposed maintenance activities. Additional information can be found within the species-specific AMMS.

GAMM-4: Trash Removal

During all activities at project sites, all construction trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following maintenance activities, all construction trash and maintenance debris shall be removed from work sites and disposed of properly.

GAMM-5: Equipment Staging

Staging/storage areas for equipment, materials, fuels, lubricants, and solvents, shall be located outside of the stream's high water channel and associated riparian area. Stationary equipment such as motors, pumps, generators, compressors, and welders located within the dry portion of the steam channel or adjacent to the stream, shall be positioned over drip-pans. Equipment shall be moved out of the normal high water area of the stream prior to refueling and lubricating. The ECC or Maintenance Supervisor shall ensure that contamination of habitat does not occur during such operations. Best Management Practices covering Chemical Use (Spill Prevention and Control); contained in the BASMAA Flood Control Facility Maintenance Best Management Practices Manual (BAASMA 2000) shall be followed. These BMPs are designed to prevent the discharge of chemicals to flood control channels and storm drain systems and allow prompt and effective response to any

accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

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 proposed activity.

GAMM-6: Invasive Species

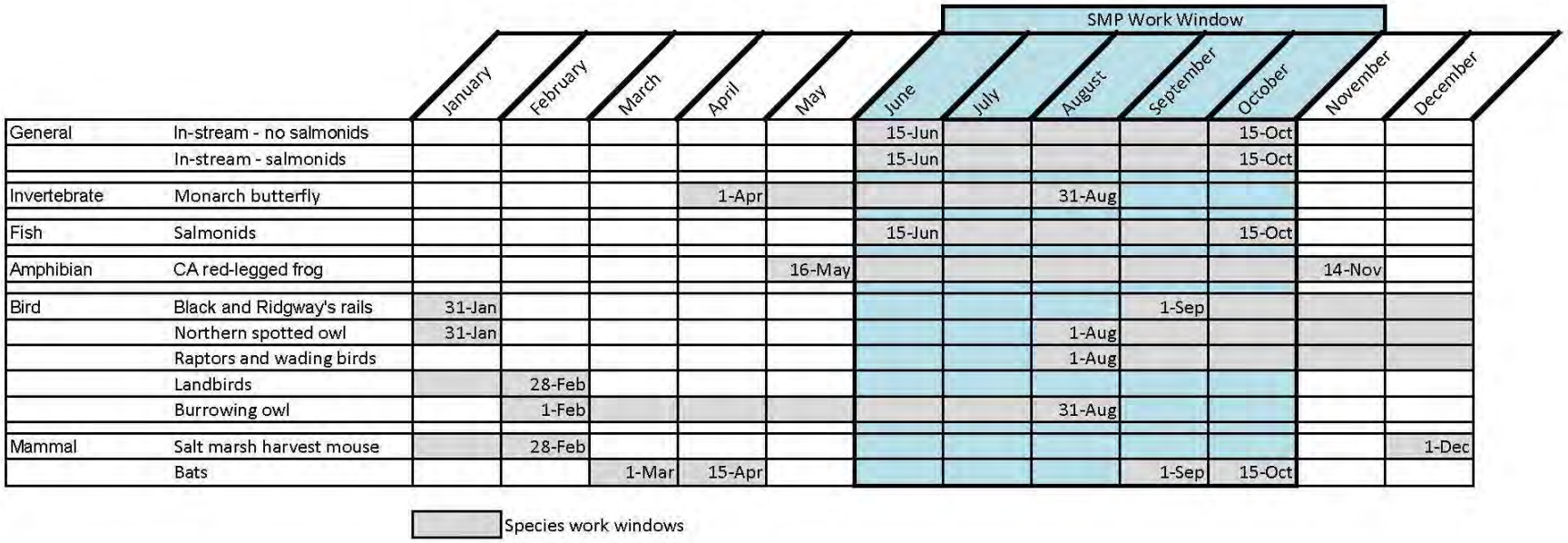
The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.

For all activities in creeks and bay, all gear exposed to water shall be allowed to dry for three days before being used again. Some disinfectants are OK to use per CDFW and USFWS (users should check with those agencies). As a precaution against invasive quagga, New Zealand mud snails (*Potamopyrgus antipodarum*), and zebra mussels (*Dreissena polymorpha*), if kayaks or any other vessels are used in maintenance activities, crew will wash and dry them off-site prior to using them in another creek or tributary. This is especially important after working in creeks with known New Zealand mud snails: Novato Creek and San Anselmo Creek by Marin Town and Country Club. See the US Geoogical Survey map of Nonindigenous Aquatic Species at https://nas.er.usgs.gov/viewer/omap.aspx?SpeciesID=1008.

GAMM-7: Open Trenches

All holes or trenches must be covered overnight, or a ramp put in place to allow wildlife to exit the hole or trench. If covering the hole, be sure to make the seal tight so lizards and mice cannot get through.

Table 3-1. Work windows.



SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES

3.5 Avoidance and Minimization Measures for Special Status Plants

PLA-1: Special Status Plants

At sites where vegetation may be modified (such as clearing or ground-breaking), and where special status plant species may potentially occur, a qualified biologist shall conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

If suitable habitat is determined to be present within the maintenance site, botanical surveys shall be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, for state listed species shall be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW 2018) and the California Native Plant Society Botanical Survey Guidelines (CNPS 2001). For federally listed species, the rare plan surveys shall also follow the Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 2000).

Surveys shall be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

If listed species are observed or presumed present, then the ECC shall take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the activity shall be planned to avoid listed plant species.

For all observed special status species, the ECC shall complete and submit a California Native Species (or Community) Field Survey Form to the CNDDB documenting the species and location.

The ECC shall ensure that the Project Supervisor is aware of these site-specific conditions, and will inspect the work site before, during, and after completion of the maintenance activities.

3.6 Avoidance and Minimization Measures for Fish

The AMM described below is designed to protect fishery resources. Coho may potentially be found in Easkoot Creek in West Marin, although they aren't known to be breeding there. Steelhead trout are known to occur within Novato Creek, Ross Valley, Miller Creek and Richardson Bay, and these measures will also protect other fish species such as Chinook salmon, sturgeon, lampreys, and Sacramento splittail.

FISH-1: Salmonids

If steelhead and/or coho salmon are known to be absent from the project site based on Center for Ecosystem Management and Restoration (CEMAR)/CDFW surveys and there are long-standing natural or artificial downstream barriers sufficient to prevent upstream migration, then avoidance has been accomplished and no further actions are necessary.

If Coho salmon are observed in the project area during winter months or during pre-construction fish capture and relocation activities, all project activities shall cease and CDFW and NMFS shall immediately be notified.

If steelhead are determined or presumed to be present in the project site, then the following Avoidance and Minimization Measures shall be implemented:

- All in-stream maintenance activities will be restricted to the low-flow period of June 15th through October 15th. Work above the top of bank or outside of the channel will not be subject to this modified work period.

- To minimize turbidity and stress to special status species, personnel shall avoid walking through stream pools and the thalweg of the channel and shall instead walk across riffles or outside of the stream bed to access a project site.

- No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified and permitted biologist.

- If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.

- Captured fish shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year fish from larger age-classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location in which habitat condition are present to allow for adequate survival of transported fish and fish already present. Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.

- If any salmonids are found dead or injured, the biologist shall contact NMFS biologist Bob Coey by phone immediately at (707) 575-6090 or the NMFS Santa Rosa Office at (707) 387-0737. The purpose of the contact is to review the activities resulting in take and to determine if additional' protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length measured, and frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS North Central Coast Office without obtaining prior written approval from the North Central Coast Office, Supervisor of the Protected Resources Division. Any such transfer will be subject to such conditions as NMFS deems appropriate.

- Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.

- If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (NMFS 1997).

- A filtration/settling system must be included to reduce downstream turbidity (i.e., filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe shall discharge onto the top of bank into a densely vegetated area, which may require extra hose length.

- Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.

- The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.

- For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures will be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream

following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

3.7 Avoidance and Minimization Measures for Invertebrates

INV-1: Monarch Butterfly

Only one project area, Zone 5, is known to have a nearby overwintering site for monarch butterflies (*Danaus plexippus*). The specific sites are along Easkoot Creek and include sites, 5-EAS-1, 5-EAS-2, and 5-EAS-3.

Avoidance will be accomplished if maintenance activities are scheduled for April 1st through August 31st.

If work occurs during the butterfly overwintering season (October through March), the ECC should walk the area of proposed activity each day before maintenance activities begin to determine if monarchs are present within the immediate work area. If none are observed, avoidance can be assumed, and work can proceed. If monarchs are observed within the site, work should not commence until all individuals have left the work site on their own.

If areas to plant arise, plants will be chosen based on their ability to support monarch butterflies, including blue dicks (*Dichelostemma capitatum*), California goldenbush (*Ericameria ericoides*), goldenrod (*Soidago* spp.), Oregon gumweed (*Grindelia stricta*), seaside fleabane (*Erigeron glaucus*), western goldentop (*Euthamia occidentalis*), and willow species (*Salix* spp.). See the Xerces Society List of Monarch Nectar Plants – California for more plant options (Xerces 2019).

3.8 Avoidance and Minimization Measures for Amphibians

AMPH-1: California Red-legged Frog (CRLF)

CRLF may be present at site 1-SRC, within program area Zone 1 and project area Upper Novato Creek Area. There have been sightings of CRLF on Mount Burdell Open Space Preserve and a breeding pond, specifically for CRLF, was created in 2018 (MCP 2021). CRLF also have potential to be within project area Zone 5.

For vegetation maintenance occurring in sites that have potential habitat for CRLF, a qualified biologist will conduct a survey prior to maintenance. The survey will determine and identify any potential breeding and/or foraging areas. These areas will be marked off and avoided.

If any ground disturbing activities will be conducted, the following the protocol outlined in the Revised Guidelines on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005) will be followed:

- At least 15 days prior to the onset of activities, the applicant or project proponent shall submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities shall begin until proponents have received written approval from the Service that the biologist(s) is qualified to conduct the work.

- A Service-approved biologist shall survey the work site two weeks before the onset of activities. If California red-legged frogs, tadpoles, or eggs are found, the approved biologist shall contact the Service to determine if moving any of these life-stages is appropriate. In making this determination the Service shall consider if an appropriate relocation site exists. If the Service approves moving animals, the approved biologist shall be allowed sufficient time to move California red-legged frogs from the work site before work activities begin. Only Service-approved biologists shall participate in activities associated with the capture, handling, and monitoring of California red-legged frogs.

- Before any construction activities begin on a project, a Service-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the importance of the California red-legged frog and its habitat, the general measures that are being implemented to conserve the California red-legged frog as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books, and briefings may be used in the training session provided that a qualified person is on hand to answer any questions.

- A Service-approved biologist shall be present at the work site until such time as all removal of California red-legged frogs, instruction of workers, and habitat disturbance have been completed. After this time, the contractor or permittee shall designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist shall ensure that this individual receives training outlined above in measure 3 and in the identification of California red-legged frogs. The monitor and the Service- approved biologist shall have the authority to halt any action that might result in impacts that exceed the levels anticipated by the Corps and Service during review of the proposed action. If work is stopped. The Corps and Service shall be notified immediately by the Service-approved biologist or on-site biological monitor.

- Pre-construction surveys should consist of two separate daytime and nighttime surveys extending 300 ft. upstream and downstream (where feasible) of the proposed work sites. If special-status species are found, CDFW and/or USFWS should be contacted to determine what actions are to be taken. The 2005 Guidance recommends a total of up to eight (8) surveys to determine the presence of CRLF at or near a project site. Two (2) day surveys and four (4) night surveys are recommended during the breeding season; one (1) day and one (1) night survey is recommended during the non-breeding season. Each survey must take place at least seven (7) days apart. At least one survey must be conducted prior to August 15th. The survey period must be over a minimum period of 6 weeks (i.e., the time between the first and last survey must be at least 6 weeks). Throughout the species' range, the non-breeding season is defined as between July 1st and September 30th.

- If a maintenance activity site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh no larger than five millimeters to prevent CRLF from entering the pump system.

3.9 Avoidance and Minimization Measures for Reptiles

REP-1: Northwestern Pond Turtle

Several sites may contain suitable habitat for northwestern pond turtle, and they have been known to occur at sites 1-ASJ-1, 1-LYC, 1-RUSH-1, and 1-WAR-2

Pre-construction surveys for northwestern pond turtle shall be conducted by a qualified biologist. The creek shall be surveyed for presence of turtles and the creek banks surveyed for presence of burrows; all locations of observed turtles and burrows should be noted.

Each day, before maintenance activities begin, the ECC shall make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, work will stop, and a qualified biologist can be called to move the turtle to a safe location outside of the work area. All applicable CDFW regulations and permits will also be followed. If a biologist is not available, the ECC shall use any means necessary to avoid "take" of these species, including removing vegetation by hand, installation of fencing, or other measures. If a northwestern pond turtle is found, CDFW will be notified within 48 hours and the sighting will be uploaded to CNDDB.

All staging areas for all heavy equipment, storage of materials, and any maintenance/fueling of heavy equipment shall be clearly identified on the grading and building plans, to minimize impacts to upland habitats outside the project site.

Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of northwestern pond turtles, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

3.10 Avoidance and Minimization Measures for Birds

Following are avoidance and minimization measures for birds. Some of these relate directly to listed species with the potential to occur within one or more project sites (the rails, northern spotted owl); however, others relate more generally to a class of species, such as raptors and wading birds and land birds.

BIRD-1: California Ridgway's Rail and California Black Rail

Several of the sites are within (5-10 sites) or immediately adjacent (15-20 sites) to suitable habitat for the California Ridgway's rail (formally the California clapper rail) and California black rails. The following measures apply to all sites in or near salt or brackish marshland and will also serve to protect other tidal-marsh dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

When working within 250 ft. of salt or brackish marshland during the period February 1st through August 31st, presence for either rail species shall be assumed.

For all maintenance activities except for mowing of levees:

- Maintenance activities shall be scheduled to occur between September 1st and January 31st to avoid the rail breeding season.

- Work shall be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active.

- Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work shall occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft. above the National Geodetic Vertical Datum, as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.

- Activities shall proceed as quickly as possible to reduce disturbance from noise, dust, etc.

- Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be

avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water line. If removal is necessary, the work shall be scheduled outside of the breeding season (February 1st – August 31st); all vegetation shall be removed by hand and shall be salvaged and retained for replacement after work is completed.

- If, for any reason other than fire fuel reduction levee mowing, the District must perform maintenance activities within 250 ft. of salt or brackish marshland during the rail breeding season, the District shall retain a qualified biologist to conduct California Ridgway's rail surveys following the USFWS Clapper Rail Survey Protocol (USFWS 2015).

BIRD-2: Northern Spotted Owl

Per the "Protocol for Surveying Proposed Management Activities that May Affect Northern Spotted Owls" (USFWS 2012), project sites for activities that do not modify spotted owl habitat but may cause disturbance to spotted owls (such as noise from weed-whackers) are defined as 0.25 mi buffers of project footprints. Several of the work sites are within 0.25 mi (1320 ft.) of known locations of northern spotted owl activity centers on Old Mill Creek, Cascade Creek, Warner Canyon Creek, Bothin Creek, Larkspur Creek, and Ross Creek (sites 3-CAS; 3-WAR; 9-BOTH; 9-LAR-2; and 9-ROS).

To avoid impacts to breeding northern spotted owls, maintenance activities at sites adjacent to habitat for northern spotted owl should follow a limited operating period with no vegetation maintenance scheduled from February 1st through July 31st. Several other agencies (e.g., Marin County Parks, Marin Municipal Water District, National Park Service) perform protocol level surveys to determine if any northern spotted owls are nesting within specific areas. If surveys coincide with the SMP project area and it is determined that there are no nesting northern spotted owls, work can be conducted before July 31st. If northern spotted owls are found to be nesting within 0.25 miles of the project area, disturbance can be minimized by using non-motorized hand tools. No work shall occur within 40 meters of an occupied nest.

If a biological evaluation determines that vegetation projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location, or where a biological evaluation determines that topographic features may shield nest sites, the limited operating period may be waived or the buffer distance modified.

BIRD-3: Raptors and Wading Birds

Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed under the Federal or State Endangered Species Act, they are protected by the Migratory Bird Act and other laws/regulations, so impacts to them

shall be minimized. Several species are also listed as Birds of Conservation Concern (USFWS) or California Species of Special Concern.

The nesting season for most raptors and wading birds occurs between January 1st and August 31st. During this time period, a qualified biologist or an ECC who has been trained in conducting bird nesting surveys, shall conduct bird nesting surveys one to seven days prior to work. If no active nests are found, work can proceed as usually. If an active nest is found, an appropriately sized buffer of no-work shall be placed around the nest. Buffer size will vary by species and/or guild and Table 3-2 offers guidance for the buffer size. A qualified biologist can reduce or increase the buffers based on the location of the nest, work to be conducted, and impacts to the nest. Buffers will be removed once the young have left the nest or if the nest is abandoned.

Table 3-2. Recommended Bird Nesting Buffers by Species or Guild

Species/Guild	**Recommended Buffer (meters/feet)**
Diurnal Raptors	76 m (250 ft)
Owls (except northern spotted owl)	50 m (160 ft)
Northern Spotted Owls	402 m (1320 ft or ¼ mile)
Double-crested Cormorant	50 m (160 ft)
Herons/Egrets/Bitterns	100 m (330 ft)
Waterfowl (Ducks, geese, swans	30 m (100 ft)
Larger passerines: Corvids (crows/jays), Thrushes	20 m (65 ft)
Most Songbirds	10 m (30 ft)
Hummingbirds	10 m (30 ft)
Woodpeckers	15 m (50 ft)
Pigeons/Doves (except BTPI)	20 m (65 ft)
Band-tailed Pigeon (BTPI)	30 m (100 ft)
Species of Special Concern (olive-sided flycatcher,	22 m (75 ft)
Blackbirds (tri-colored and red-winged)	30 m (100 ft)
Killdeer	22 m (75 ft)
Western Meadowlark	30 m (100 ft)
California Quail	20 m (65 ft)
Turkeys and Starlings	6 m (20 ft)

If work is scheduled to take place outside of the nesting season (August 31st – December 31st), then a bird nesting survey is not required. However, some species of birds may have double clutches and some birds have altered their breeding patterns due to climate change. Therefore, the ECC shall walk the site before work occurs to check for nests and the presence of birds. If the ECC is unsure if a bird is nesting, a qualified biologist will be called to confirm.

Western burrowing owls (*Athene cunicularia*), a federal bird of conservation concern and state species of special concern, no longer nest within Marin County (Klute Et. Al. 2003). Burrowing owls can be found overwintering within Marin County and some overwintering sites are protected. There are no know occurrences of burrowing owls within the project areas. Surveys for active burrows during the overwinter season (September 1st – January 31st) will be conducted in suitable habitat prior to work. Most of the project areas consist of non-suitable habitat types, with only California annual grassland potentially providing overwintering habitat. If active burrows are found during a survey, a buffer of no-work will be placed around the active burrow. Other measures, such as using hand tools, could also be used to reduce stress to the animals.

BIRD-4: Landbirds

Many of the sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. These sites include: 1-NOV-3, 3-NYH-2, 5-EAS-2, 9-CMC-4, and many more.

Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests violates the federal Migratory Bird Treaty Act and California Department of Fish and Game Code.

Avoidance will be achieved if maintenance activities are scheduled for August 1st to December 31st to avoid the nesting season (January 1st to July 31st). However, some species of birds may have double clutches and some birds have altered their breeding patterns due to climate change. Therefore, the ECC shall walk the site during the non-nesting season before work occurs to check for nests and the presence of birds. If the ECC is unsure if a bird is nesting, a qualified biologist will be called to confirm.

If maintenance activities are scheduled during the nesting season, then the following AMMs should be followed:

- The removal of any trees or shrubs should occur (if possible) between August and December, outside the nesting season. If removal of trees or shrubs occurs, or maintenance begins between January 1st and July 31st (bird nesting season), a nesting bird survey shall be performed within seven (7) days prior to the removal or disturbance of potential nesting trees or shrubs. Bird nesting surveys shall be conducted by a qualified biologist or an ECC trained in conducting bird nesting surveys. Keep in mind that other restrictions to tree removal, including the presence of bats, may also impact tree removal schedules.

- In addition to surveying trees and shrubs for nesting birds, surveys shall be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within seven (7) days prior to the commencement of project related activities. Surveys will also include all staging areas and areas where equipment will turn around.

- All active nests shall have a non-disturbance buffer zone established, or the site shall be avoided until it has been determined that the young have fledged (i.e., left the nest). Buffer zones will be determined by the species and follow guidelines in Table 3-2. A qualified biologist can modify the buffers if necessary. Active nests shall be monitored to determine when the young have fledged and the area is clear to have work continue.

- Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of sensitive habitat and bird species, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

3.11 Avoidance and Minimization Measures for Mammals

There is only one listed mammal in the project quad maps; and the mammals on the species of concern list are all bat species. AMMs for mammals are below.

MAMM-1: Salt Marsh Harvest Mouse (SMHM)

Most of the sites are not in, nor adjacent to, salt marsh harvest mouse habitat; avoidance has been achieved for those sites. Approximately 15-20 sites are adjacent to suitable habitat for salt marsh harvest mouse; and about half of those sites include work which may require impact to salt marsh harvest mouse habitat by removal of pickleweed. For these sites, the following AMMS shall be followed:

- When implementing maintenance activities in uplands adjacent to salt or brackish marshland, vehicles will be confined to existing roads where possible, and disturbed areas shall be re-vegetated with locally native brackish marsh species. Crews shall use matting, pontoon boards or other comparable methods whenever feasible to minimize impacts to the existing vegetation. The placement of mats will be approved by CDFW before their placement. Crews shall work exclusively from mat boards and boardwalks to minimize trampling of vegetation.

- If maintenance activities are conducted outside the breeding season, in coordination with USFWS and CDFW, pre-construction surveys shall be conducted within five (5) days of the start of maintenance activities to check for presence of

mice within the project sites. In addition, the ECC shall be present during maintenance-related activities along and adjacent to all suitable nesting habitat areas to ensure that salt marsh harvest mice are not present.

- Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for SMHM. Generally, work should not be scheduled to occur between two hours before high tide and two hours after high tide.

- Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible.

- Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of the salt marsh harvest mouse and its habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

- For project sites where work will intrude into tidal marsh habitat, the ECC shall survey the site prior to beginning work in order to determine the presence/absence of SMHM, and the following measures shall be implemented:

- Under the supervision of the ECC, vegetation shall be removed only with non-mechanized hand tools; no motorized equipment shall be used. Vegetation removal may begin only when no mice are observed, or with CDFW approval, and shall start at the edge farthest from the salt marsh and work its way towards the salt marsh. If a mouse of any species is observed within the areas being removed of vegetation, work shall stop and CDFW shall be notified. Unless otherwise approved by CDFW, the mouse shall be allowed to leave on its own volition. Removal of pickleweed will generally follow Zedler (2001).

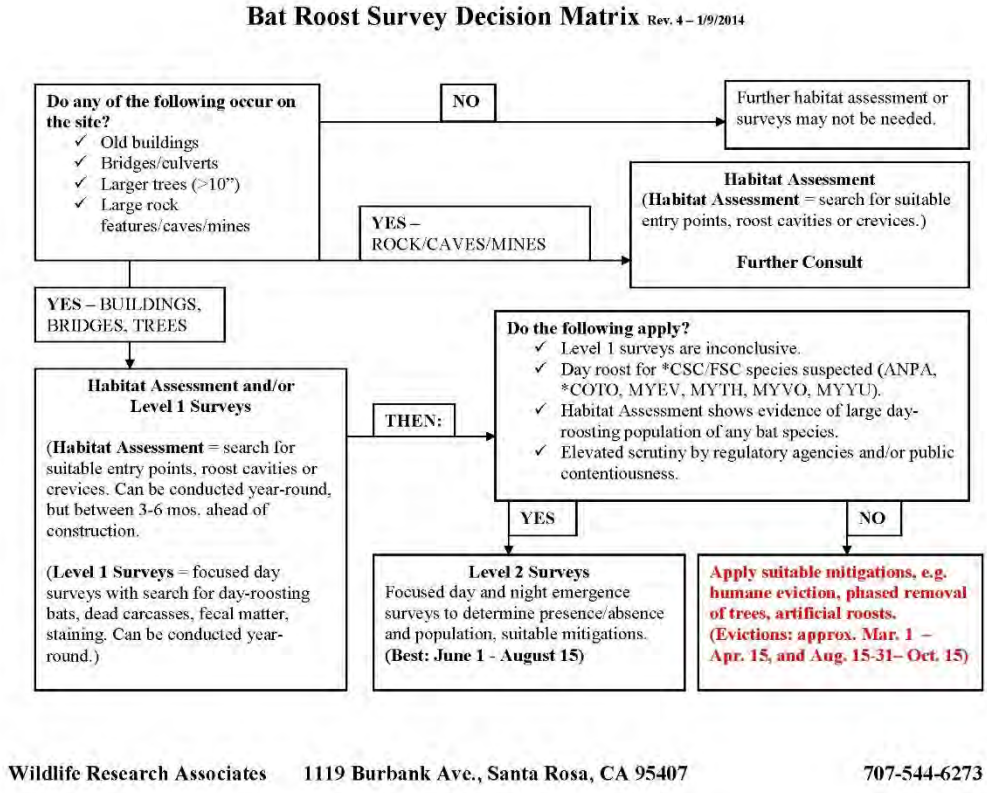
- If trenching takes place within 50 ft. of pickleweed areas, visqueen fencing shall be installed around worksites within pickleweed before excavation activities begin. CDFW will approve the size and placement of fencing. An escape ramp shall be placed in any open trench at the end of the day to allow any entrapped animals to escape.

- The ECC shall be on-site and shall halt project activities if necessary to comply with these terms.

MAMM-2: Roosting Bats

There is a known roosting site, containing several species of bats, under the bridge at Novato Boulevard and Warner Creek. Bats have been observed there during the maternity season, so it is assumed that this is a maternity roost. Other sites may be within or adjacent to suitable habitat for roosting bats. During pre-project inspection and project implementation the following AMMs will be implemented to protect all bat species:

- Pre-construction surveys will consist of evaluating the habitat for roosting bats and will be concurrent with nesting land bird surveys. Only qualified biologists will conduct these surveys. The *Bat Roosting Survey Decision Matrix* (see below) created by Wildlife Research Associates will be used to evaluate the habitat for roosting bats. Other signs, such as bat droppings, will also be used to determine if bats are using the area. Bat droppings are small (4-8 mm long), black/brown, and crumble into a powder when crushed, due to the insectivore diet of bats. Mouse droppings are similar in size and color but are sticky when fresh and hard when old.



- If trees will be removed or other vegetation/structures that could have roosting bats will be removed/are nearby, a daytime bat roosting evaluation form will be filled out to determine if a nighttime survey is required. Nighttime surveys consist of watching the tree (or other vegetation/structure) 30 minutes before and 30 minutes after sunset, to see if anything leaves the vegetation or structure.

- If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed.

- If bats are detected, work should be re-scheduled to occur within these dates: March 1st – April 15th and/or September 1st – October 15th in order to avoid the maternity season and winter hibernation/torpor. If a maternity or winter roost is found within the project site, a 100-foot buffer of no work around the roost will be created to protect the bats. In addition, the California Department of Fish and Wildlife will be consulted if there are any questions or doubts on how to protect roosting bats.

- Removal of vegetation where bats have been known to roost shall follow the two-phased removal system: Day 1, a qualified biologist will identify limbs and branches that will be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures will be avoided, and only branches or limbs with those features will be removed. Day 2: the entire tree will be removed.

- Training sessions shall be given to all workers during bat breeding season to inform them of protective measures, details about the two-phase tree removal protocol, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

3.12 Mitigation Monitoring

Monitoring will be used to determine compliance with success criteria and to assist in the evaluation of specific mitigation methods. Monitoring reports will be provided to the resource agencies in the Annual Summary Report. Changed site conditions that affect the ability to meet monitoring requirements will be described in the monitoring reports. The following process will be implemented to monitor mitigation measures:

- Tree and shrub planting sites will be monitored by a qualified biologist to evaluate the survival and successful establishment of the plantings. Monitoring will be conducted over a 5-year period with assessments performed in Years 1, 3, and 5 following planting. The data collected during monitoring visits will be used to determine if success criteria are met and to recommend management modifications or the implementation of contingency measures, as necessary, to help meet the final success criteria. Site performance and final success will be evaluated through both quantitative and qualitative monitoring. If the final success criteria are not met by Year 5, remedial measures will be implemented and monitoring will continue annually or as otherwise stipulated in writing until the success criteria are achieved.

- Baseline site conditions at the time of plant installation will be documented in the field. At the time of planting the number, location, and species of trees and shrubs planted and the square footage of the area planted will be recorded. Baseline photographs will be taken at fixed, pre-designated photo points immediately following initial plant installation.

- Planting areas will not be impacted for a minimum of 10 years after planting. If there are impacts to a tree and shrub planting mitigation area, the impacted mitigation area will be replaced in-kind and the monitoring clock will be reset for those areas for another five (5) years.

Success Criteria and Remedial Actions

- **Plant Survival:** Plant survival will be monitored in Years 1, 3 and 5. Plant survival will be assessed in upland areas, which are defined by the Stream Maintenance Program as the areas above the normal reach of streams or rivers and characterized by non-wetland vegetation.

- **Percent cover:** Percent cover of all native woody vegetation will be assessed in Years 3 and 5 in riparian areas, which are located along the water's edge. As defined in the Stream Maintenance Program, "riparian" is the area located along the edge of a channel, generally on the floodplain, characterized by access to and influence of the channel, but not in it. A riparian zone or riparian area is the interface between land and a river or stream. The success criterion for absolute percent cover in riparian areas is 30% in Year 3 and 75% in Year 5. There are no percent cover related success criteria in riparian areas for Year 1 as it is assumed the mitigation plantings will be in the early stages of development. Percent cover of all native woody vegetation will be assessed in Year 5 in upland areas. The success criterion for percent cover in upland areas is 30% in Year 5. There are no percent cover related success criteria for upland areas in Years 1 and 3 as it is assumed the mitigation plantings will be in the early stages of development. If the success criterion is not met in Year 5, remedial measures will be discussed with the permitting agencies.

4.0 MAINTENANCE ACTIVITIES

4.1 Overview

The SMP encompasses five types of maintenance activities:

1) In-stream vegetation management
2) In-stream sediment and debris removal
3) Erosion control
4) Maintenance and repair of flood control structures in channels
5) Levee maintenance - gopher control like grouting burrows or cutoff, and adding drivable surfacing

Most in-stream maintenance activities occur during the dry season from June 15th to October 15th. However, timing may be affected by weather. Work prior to June 15th is typically limited to fire fuel reduction and non-native seed reduction. Unless expressly stated in the frequency and timing sections below, if work is scheduled outside the June 15th to October 15th dates, the District will notify CDFW of its intentions.

The following chapters describe the various components, frequency and timing, and contractor details for each type of maintenance activity. At the end of each section is a list of activity-specific conditions that are to be followed when conducting these activities.

In addition to the activity-specific conditions, the SMP is subject to General Conditions for all activities.

4.2 General Conditions for all Activities

GACT-1 The District shall designate an ECC to oversee the implementation of the SMP in the field. Before commencement of a maintenance activity, the ECC shall review the Site Fact Sheet (Appendix D) for specific information on the type, location and extent of the activity and associated areas of disturbance and determine the Avoidance and Minimization Measures to implement prior to the maintenance activity for protection of water quality and special status species (*endangered, threatened, rare, and candidate species*) and their habitat. If any changes are observed at the site, the Fact Sheet shall be updated and submitted to CDFW. The ECC shall distribute the Site Fact Sheet to the Maintenance Supervisor five days before beginning the maintenance activity.

GACT-2 Avoidance and Minimization Measures (AMMs), as prescribed in the Biological Assessment for the SMP Program (Appendix E), shall be implemented during prescribed maintenance activities to ensure that

Special Status Species and their habitat are not adversely impacted by maintenance activities.

GACT-3 Existing stream and riparian habitat conditions such as pools, riffles and wetlands shall be protected to the maximum extent. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations.

GACT-4 If a maintenance activity may cause the introduction of sediments into the stream, no phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the startup of any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the ECC shall inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

GACT-5 Appropriate BMPs shall be incorporated into each project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. BMPs to be implemented for each type of activity are referenced in Appendix F.

GACT-6 No heavy equipment shall be operated within stream channels where there is flowing or standing water.

GACT-7 There shall be no permanent loss or significant temporal loss of wetland or riparian habitat in terms of acreage, function, or value.

GACT-8 No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area where such material may be washed into waters of the State.

GACT-9 Activities shall not result in any permanent barriers to upstream or downstream migration of anadromous fish.

5.0 VEGETATION MANAGEMENT

Selective vegetation trimming and removal of instream vegetation is the most common maintenance activity and is conducted in order to maintain flow conveyance and to maintain access to District facilities. The District typically only does maintenance work where there is a history of and/or high risk for flooding. These are portions of a creek that typically have been developed very close to the top of bank and within the floodplain. Bank erosion and flash flooding threaten nearby structures, making them unforgiving systems in which to experiment with maintenance practices.

Currently the goal of the District's maintenance work isn't to try to change channel roughness. Doing so is likely to change the aesthetic character and habitat value which are high priorities in most of our communities. The District strives to strike a balance between these interests and the expectations of flood protection - which are already often not met in areas where the District conducts maintenance; i.e., frequently residents expect 100-year protection but many channels have portions with only 5-year capacity. The primary goal is to remove obstructions which is difficult to boil down into a quantitative trigger. Therefore, we use pictograms to generally describe to maintenance crews how to manage vegetation. Site specific information and considerations for maintenance triggers are summarized in Appendix K.

5.1 Maintenance Goals and Triggers

Vegetation management activities are implemented to achieve these main goals:

- maintain or improve stream channel flow capacity to reduce risk of flooding
- maintain access to streams, channels, and flood control facilities
- restore creek habitat by removing invasive nonnative plants and encouraging the establishment of native plants particularly in the understory
- remove trees that are hazardous to life and neighboring properties
- maintain stable streambank conditions, and where possible enhance instream ecologic conditions through:
    - reducing and removing exotic and invasive species
    - encouraging the growth and presence of native vegetation
    - developing a mature and complex riparian canopy of native species
    - managing and enhancing bank vegetation to improve streambank stability
    - managing emergent vegetation in the channel

Meeting these goals requires a balance between flood protection needs and habitat stewardship. In general, vegetation maintenance is triggered when one or more of the following conditions occur in areas of creeks where the District has ownership or maintenance easements, with areas of District fee title ownership and with a recent history of flooding being higher priority:

- Vegetation growth is significantly decreasing flood conveyance capacity, especially where infrastructure is at risk
- Vegetation growth impedes access to channels and flood control facilities
- Excessive non-native vegetation growth at the top of bank or at critical access points constitutes a fire hazard to surrounding infrastructure
- Nonnative invasive plant species are reducing the success of native vegetation
- Live trees are creating excessive hydraulic roughness, diverting flow or dead/dying trees are reducing stream capacity and/or creating a safety hazard.

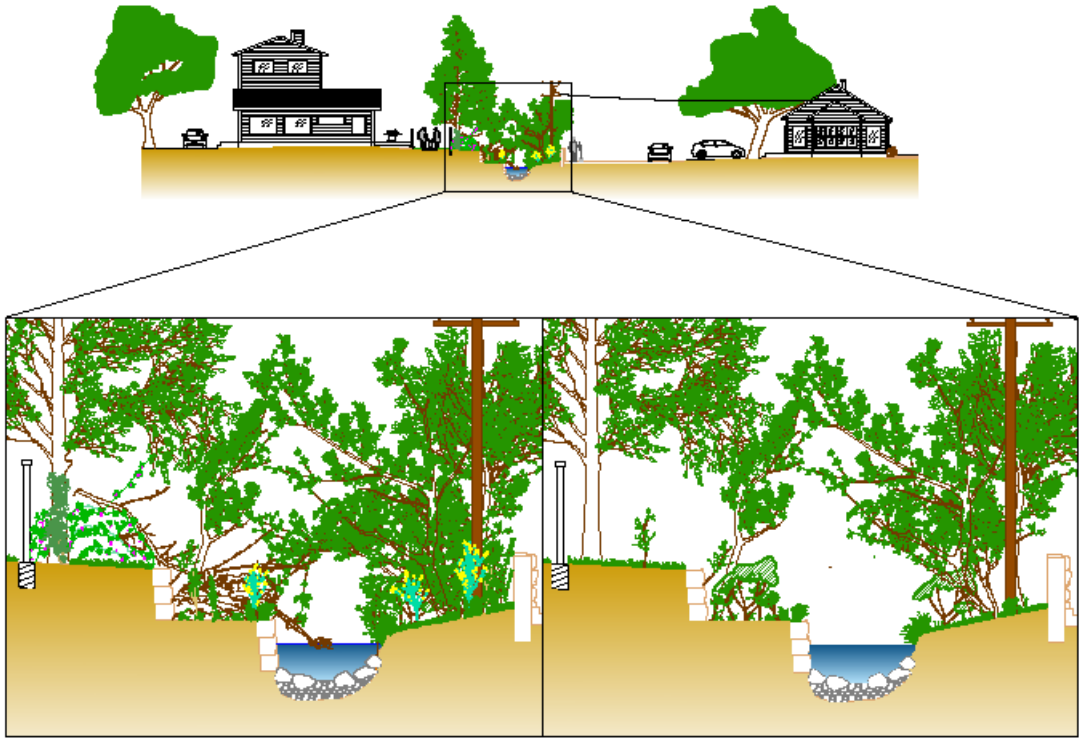
The need for vegetation management activities is unlikely if none of these trigger conditions are present. The District is moving away from performing this work on privately owned properties

5.2 Pictograms

The following pictograms give a 2-D picture of what vegetation looks like prior to and after selective removal from different channel types that the District maintains. There are three different channel types: Engineered, Modified, and Natural. Engineered channels are designed and modeled channels with specific flood carrying goals. Modified channels are water courses that were changed geometrically by land developers for drainage purposes. Natural channels have not been geometrically modified to meet any drainage or flood goals.

The below pictograms represent one of the channel types (e.g., Engineered, Modified, and Natural), with an example of a specific creek that shows that type of channel. Work includes removing fallen trees and branches from the channel that could potentially stop water flow. Other vegetation (such as shrubs and cattails) are thinned and/or trimmed.

Example of a Modified Engineered Channel
(e.g., 1-VIN Downstream of Center Road Bridge)

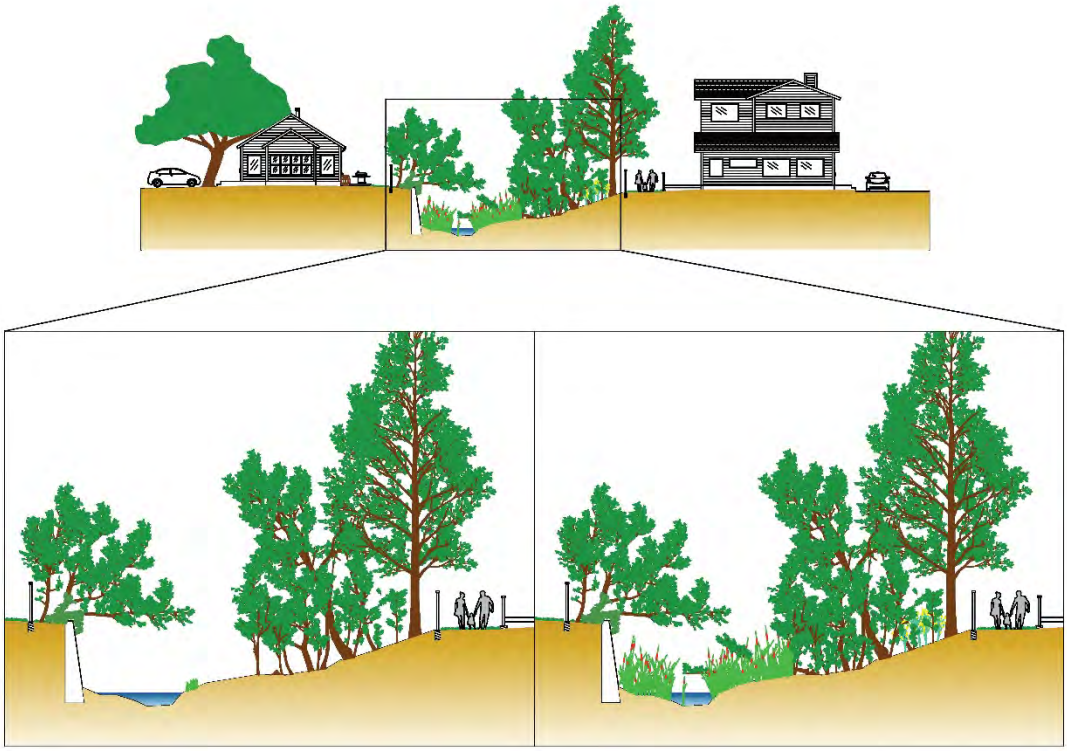


Before Annual Maintenance **After Annual Maintenance**

The above pictogram represents a modified engineered channel. In this specific example, a low flow channel and floodplain terrace were created and reinforced with plantable concrete blocks (native vines were planted in spaces) in 2008 and 2009. Rock cross vanes were added to concentrate flows to the center of the creek preventing bank erosion and scouring pools downstream as fish habitat. Trees and sedges were planted at the rock vanes to improve habitat and shade. Native shrubs and trees were planted on floodplain terraces and tops of bank. Barriers to fish passage were eliminated through improvements to two bridges in the reach, and the installation of two rock fish ramps. A HEC-RAS model was created during design of this project to provide 50-year flood capacity. Each model cross section had roughness designated based on designed materials and vegetation (e.g., shrubs, single trunk trees, blocks, soil, grass, etc.). Maintaining the designed condition is the maintenance goal.

Example maintenance activities at this site include removing invasive ivy from tree trunks to increase lifespan of the tree, remove downed branch given there is no room in the channel for it as designed, plant new native trees at the top of bank where there is space and appropriate sunlight, prune lower branches in lower floodplain areas to encourage single trunk growth of canopy trees, remove invasive species on bank like French broom.

Example of a Modified Engineered Channel
(e.g., confluence of Warner and Novato Creeks [1-WAR-1])



After Annual Maintenance **Before Annual Maintenance**

Above is another pictogram of a modified engineered channel. Similar to many of our sites, there is very little room between the creek and flood-prone residences. Adjacent residents watch cattail growth closely and report being nervous when they see significant growth. In 2019 for example, before the 2020 sediment removal project (permitted outside the SMP), adjacent residents reported their neighborhood flooded six times that winter.

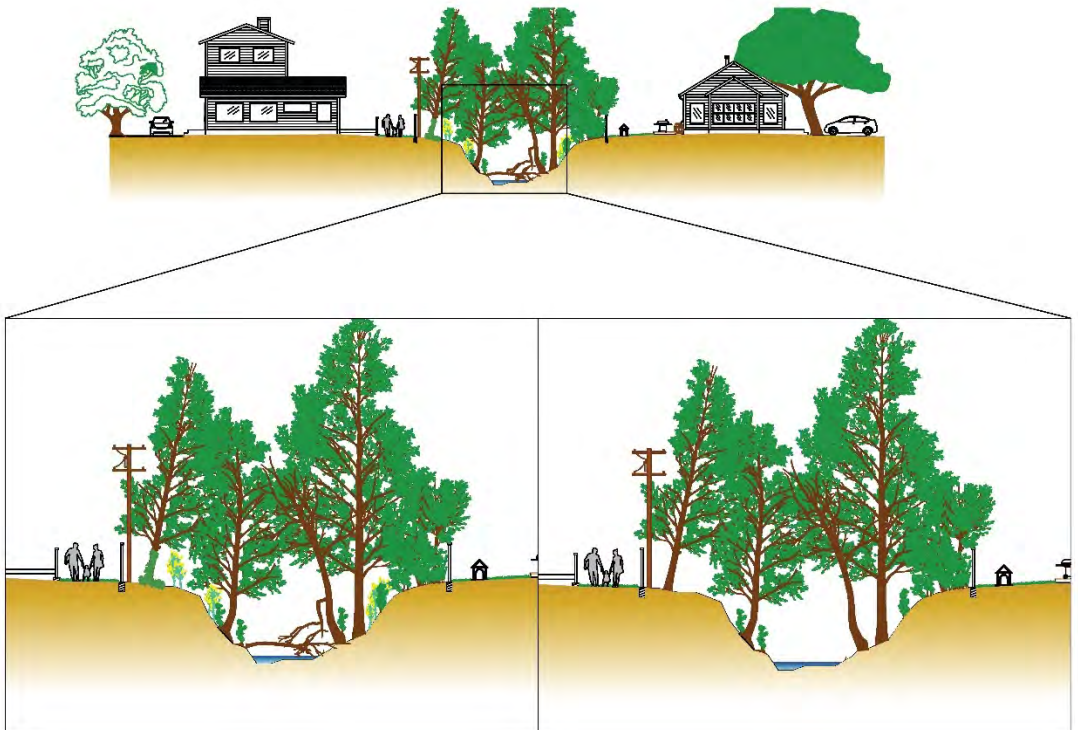
The reach as part of Phase IV of the Novato Creek Flood Control Project in 1991, one side of the bank was excavated back to a gentle vegetated slope and the other side was installed a nearly vertical concrete retaining wall. The goal of the project was to provide a 50-year level of flood protection, however updated modeling shows that the level of protection is now closer to 10-year.

Steelhead are sometimes found in the reach during the quadrennial Novato Creek sediment removal project which includes this part of Warner Creek. Steelhead are transported to the Phase VIII reach during the sediment removal.

Annual maintenance however only includes vegetation maintenance and not sediment removal here. Downed branches or trees blocking the active channel are removed, and cattails are trimmed down to the water line. The practice of leaving cattail roots in place has caused increased sediment deposition in those areas. There is a tradeoff between minimizing cattail removal and minimizing sediment removal needs.

In general, we plant trees on the bank in all reaches where there are recurring flood issues associated with cattail growth, as this shade helps prevent cattails from choking off the full channel cross section. Due to limited funds, the District can't do as much tree planting (and associated watering and weeding during first few years) as we would like so we are seeking grants and other funding sources.

Example of a Natural Channel
(e.g., Novato Creek downstream of Novato Boulevard [1-NOV-3] and 1-WAR-2)

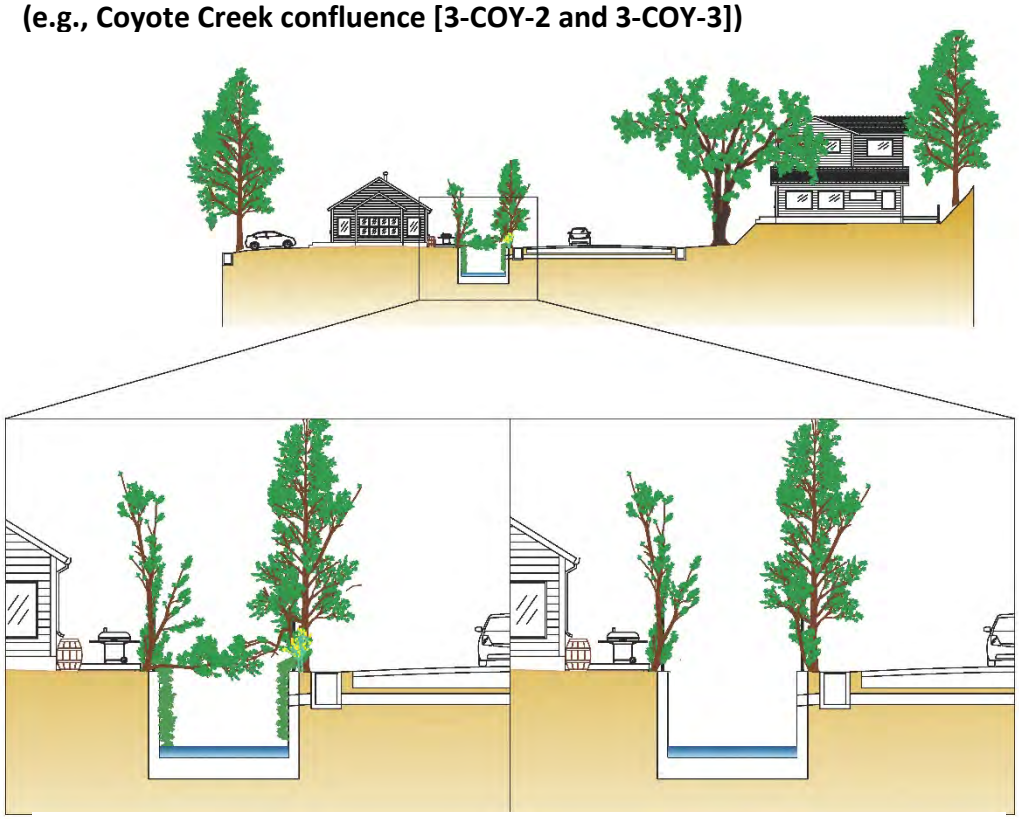


Before Annual Maintenance **After Annual Maintenance**

The above pictogram is an example of a natural creek channel. This reach of creek also has residential structures adjacent and no available floodplain. The reach and its Novato Creek Flood Control Project Phase VIII is described in more detail in Section 2.5 *Salmonid* Conservation in subsection 4 *Large Woody Debris*. The site is maintained to remove debris

from the active channel that may obstruct flow, and as noted Section 2.5 *Salmonid Conservation* in subsection 4 *Large Woody Debris*, sometimes there are opportunities to retain LWD in the stream. Additionally, a lot of trash is removed from this reach each year.

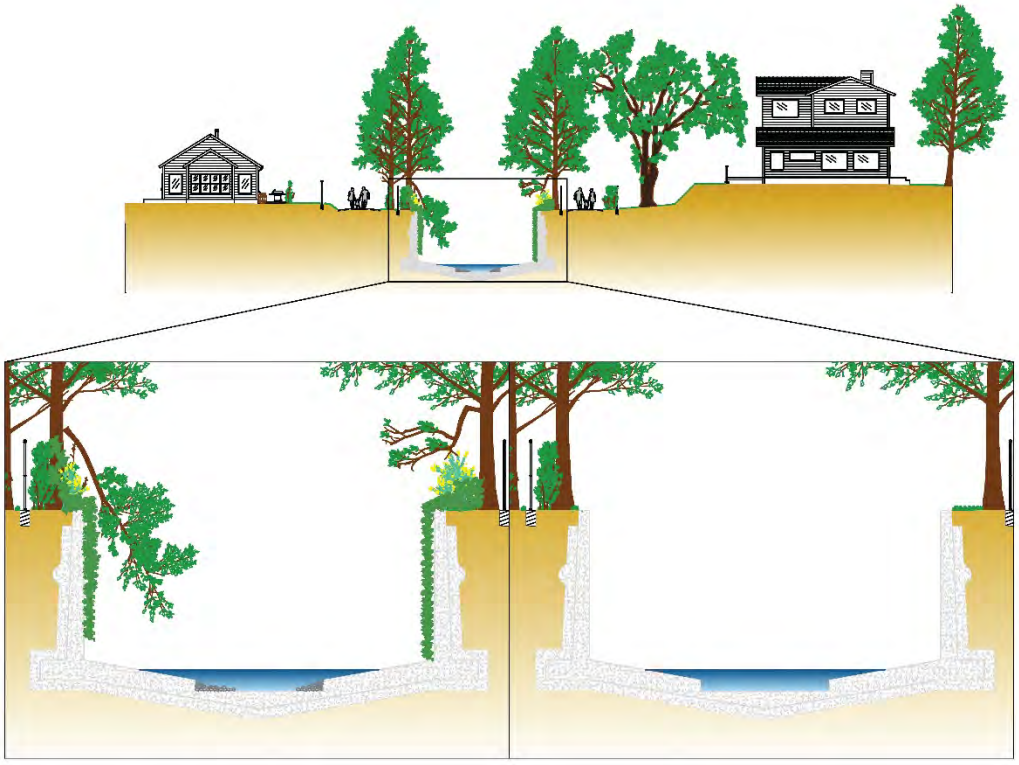
Example of a Concrete Engineered Channel
(e.g., Coyote Creek confluence [3-COY-2 and 3-COY-3])



Before Annual Maintenance **After Annual Maintenance**

The above pictogram is an example of a concrete engineered channel. Vegetation in concrete channels are trimmed or removed following USACE ETL 1110-2-583 & EP 1110-2-18 Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures (USACE 2014 and USACE 2019). Vegetation is maintained to allow proper inspection of concrete wall segments/panels.

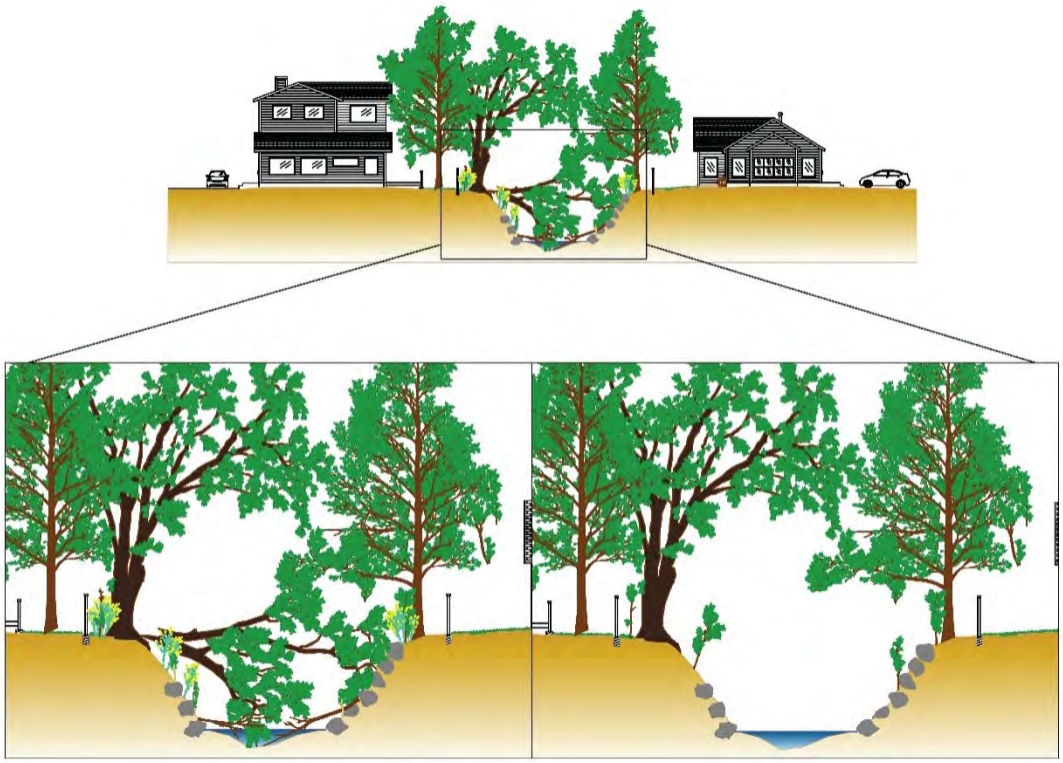
Example of a Concrete Engineered Channel
(e.g., 9-CMC-1 and 9-CMC-2)



Before Annual Maintenance **After Annual Maintenance**

The above pictogram is another example of a concrete engineered channel. Vegetation is trimmed and maintained following USACE Vegetation Management at Floodwalls, Embankment Dams, and Appurtenant Structures (USACE 2014 and USACE 2019). Vegetation must be maintained to allow proper inspection of the floodwalls. In addition, the sunken areas in the middle of the concrete channel are fish resting pools. The distance from each fish resting pools varies, but in some areas, they are about 60 feet apart. The fish resting pools are approximately 12 ft long by 4 ft wide by 1 ft deep. Sediment is removed here to allow salmonids a place to rest before swimming upstream to spawning areas. The amount of sediment that accumulates varies each year, depending on storms over the winter.

Example of a Modified Earthen Channel
(e.g., 1-WAR-1, 1-NOV-2)



Before Annual Maintenance **After Annual Maintenance**

The above pictogram is a modified earthen channel. The sides have rip rap to stabilize the soil. An example is found within Warner Creek, where the channel is narrow. Any large vegetation that falls within the creek in this narrow reach has the potential to cause damming or divert water that could cause flooding to adjacent properties and decrease the flow capacity of the creek. In this example, a large tree is removed to reduce the chances of flooding. Similarly, Novato Creek is a modified earthen channel. However, Novato Creek has a high flow carrying capacity, so large vegetation within the creek may not cause flooding as easily as Warner Creek. The large woody debris (LWD) can be evaluated to determine if it can stay within the creek and not cause flooding.

5.3 Description of Vegetation Maintenance Activities

Maintaining channel capacity is achieved by selectively limbing and trimming trees that directly block flow, cattail cutting, removing invasive vegetation, and clearing trash. These activities may occur from the channel bottom to the top of bank with a focus on retaining over hanging, low lying herbaceous vegetation along the edge of channel for habitat purposes and controlling channel roughness with selective limbing and trimming on the

upper banks. The goal is to maintain canopy cover for shade over the water and to shade out invasive non-native plants (Figure 5-1). Low lying vegetation along the edge of the channel remains in place for habitat, while channel conveyance is maintained by selectively trimming vegetation on the upper bank. These activities employ vegetation control methods such as cutting and removing vegetation above the ground by hand or with loppers, hand saws, chainsaws, pole saws, weed eaters and other hand tools. Vegetation management activities do not include ground-disturbing activities. Bladed weed-eaters are used to cut cattails. Entire cattails, including their roots, may be removed as part of sediment removal activities as well. Pesticides and herbicides are not used by the Flood Control District in any form to control vegetation or maintain stream channels.



Figure 5-1. Photo of vegetation management on Warner Creek (Novato) after maintenance was completed.

Tree removal is a rare event. The decision to remove individual trees will be made in the field by District staff familiar with watershed vegetation and creek ecology. Removal of mature, healthy, native trees is only indicated when pruning is insufficient to reduce the unacceptably high hydraulic roughness in the channel. For example, an arroyo willow

growing on a newly established gravel bar may need to be removed if it threatens to block flow through a structure or its establishment could shift flow dynamics forcing erosive flows against an un-protected residential bank. Annual pre-project notification to the RWQCB and CDFW will include an inventory of any trees of 6-inch diameter at breast height or greater that need to be removed for flood control purposes.

Removal of sick, dying, or dead trees is indicated when they reduce channel capacity, increase flood hazard, and/or are a safety hazard to adjacent structures. Tree health and hazard potential will be determined by appropriate environmental staff (arborist and/or biologist). Snags will be left in place to provide habitat for birds and small mammals if they do not otherwise pose a flood or safety hazard. Staff will consult with CDFW whenever possible if tree removal is necessary, and retention of large wood debris in the creeks will follow objectives included in Section 2.5 - Salmonid Conservation. If a small native tree requires removal, it will be evaluated for potential use in another location. Alders, red willow, or yellow willow with a single trunk are most desirable for relocating. If it can be used in another location, the tree will be replanted. Large willows that require pruning may be cut into large sprigs and planted on a bare slope or incorporated into a slope stabilization repair.

As the vegetation communities within the District maintained area varies, not all areas will be maintained for canopy cover. Some areas, such as wetlands, marshes, and Baylands, did not historically contain trees and adding trees can change the function and ecological value of those systems. For example, adding trees can increase raptors to a marshland, where the salt marsh harvest mouse is located. The increase in raptors can lead to an increase in loss of the mice.

Invasive Non-Native Plant Removal

Removal of non-native vegetation takes place as part of maintaining channel capacity but also occurs in a more strictly restoration-type activity, as with STRAW projects. Re-vegetation activities under the SMP generally occur after other maintenance work has occurred, such as erosion control or emergency repairs, or in conjunction with STRAW. Pesticides and herbicides are never used by the District to control vegetation in creek channels within Marin County.

5.4 Frequency and Timing

Vegetation management activities are scheduled to occur during the dry season from April 15th to October 15th, weather permitting, and may occur on all sites annually. Within that range, specific types of activity occur as follows:

- Mowing of levees for access and safety usually occurs from April 15th to October 15th

- Vegetation pruning within creek channels occurs from June 15th to October 15th
- Cattail removal (i.e., only above root vegetation) occurs from August 31st to October 15th, so that cattails do not reestablish before winter storms
- Re-vegetation and tree planting and/or relocating may occur throughout the year and depends on the best timing for successful planting

Generally, channels dominated by fast-growing cattails and/or willows will require annual pruning, while channels with a mature riparian canopy generally require less frequent maintenance to maintain flow capacity. All project sites are inspected annually but not all sites may require maintenance as defined in this manual. Frequency is also affected by weather; wet years may result in more vegetation growth, and years that experience flooding or strong winds may require additional work to clear downed trees or vegetation debris. Annual work plans will reflect current year conditions. The ECC will conduct annual walk-throughs of all sites to determine the upcoming season's list of sites for the pre-project notification list.

5.5 Contractor Details

Vegetation maintenance work is performed by a mix of District staff, CCNB, DPW road crews, and/or private contractors. CCNB is contracted to perform most of the work, with District staff on site most of the time. District staff may perform tasks of a smaller duration and extent that don't require full CCNB crews. Average work duration depends on the site conditions in any given year. For most sites undergoing vegetation maintenance activities, work is completed within 2-3 days using 1-2 CCNB crews. Private contractors are hired for arborist work and specific tasks requiring advanced skills beyond what District staff and CCNB crews hold.

5.6 Conditions for Vegetation Maintenance

VEG-1 Generally, vegetation management shall be designed and conducted to meet the objectives of design capacity, channel and basin stability and accessibility while maximizing the shade, erosion control, water quality, and habitat functions of the vegetation.

VEG-2 Removal of trees in bat habitat should follow the two-phased removal system: Day 1, in the afternoon, limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures would be avoided, and only branches or limbs with those features would be removed. Day 2: the entire tree would be removed.

VEG-3 Non-native, invasive trees and bushes (e.g., tree of heaven (*Ailanthus* ssp.), acacia (*Acacia* ssp.), white poplar (*Populus alba)*, Lombardy poplar (*Populus nigra 'Italica')*, eucalyptus (*Eucalyptus* ssp.), London plane tree (*Platanus* x

hybrid), Indian bean (*Catalpa* sp.), privet, (*Ligustrum* sp), broom (*Cytisus, Genista, Spartium*, etc.), red clusterberry (*Cotoneaster* sp.), and ivy (*Hedera* sp.), may be cleared from the top-of-bank area or within the channel.

VEG-5 Vegetation management does not include the use of dozers, loaders, excavators and other heavy tracked or rubber tired equipment, with the exception of mowing equipment.

VEG-6 Maintaining channel capacity is achieved by selectively limbing and trimming trees that block flow directly, cattail cutting, removing invasive vegetation and clearing trash. These activities may occur from the channel bottom to the top of bank as needed, with a focus on retaining low lying vegetation along the edge of channel for habitat purposes and maintaining canopy cover for shade.

VEG-7 Typically, mowing occurs from the top of bank all the way to the homeowner's fence line. Brush cutters and weed eaters are used to mow vegetation. Armed mowers may be used in large flat areas such as levees. Riparian and marsh vegetation adjacent to the areas of mowing are protected during mowing activities.

VEG-8 Areas where non-native vegetation has been removed may be re-vegetated with appropriate California native species and protected using appropriate erosion control methods, to the maximum extent practicable. An erosion control seed mix native to the region shall be used to control erosion where needed and local plant materials and seeds derived from that watershed should be used whenever possible.

VEG-9 Mulch or tree chips may be used to cover bare soils and if straw is used as mulch it must be seed free straw.

VEG-10 Vegetation management and replanting measures shall maximize shading of the active channel, stabilization of active channel banks, and quality of in-stream habitat as described in the Regional Water Board's 2009 Technical Memorandum: "Maintenance, Management, and Monitoring Protocols for Stream Projects That Must Take Flood Risk into Consideration.

VEG-11 Vegetation management measures shall include incorporation of environmental quality features into concrete or grouted flood control channels to the maximum extent practicable

VEG-12 Emergent vegetation that impedes channel capacity shall be managed by removing above-ground biomass with manual methods, such as a scythe or

weed whacker, in the fall after the bird nesting season is complete and leaving the subsurface rhizomes untouched. SMP sites at the confluence of creeks and up or downstream of culverts or flood control structures where vegetation has grown into the active channel may be approved for full removal of subsurface roots if it is determined to be necessary in order to maintain a low flow channel.

6.0 SEDIMENT AND DEBRIS MANAGEMENT

Sediment management activities are conducted when pipes or other facilities are blocked or interfere with conveyance, and/or sediment is removed from the streambed to maintain capacity at a road crossing or a flood control facility.

6.1 Description of Sediment Removal Activities

Sediment is removed from natural channels and ditches, concrete-lined channels and from engineered sediment basins to maintain flow conveyance and capacity. Sediment removal activities described in this manual are not implemented routinely but as needed to maintain flow conveyance. Removal of cattail roots within stream channels is considered sediment removal, while only cutting the tops of cattails (i.e., no root removal) is considered vegetation maintenance.

Sediment removal is conducted after culverts, channels or other facilities have been inspected by Flood Control Engineers or an Engineering Technician and are found to be blocked by sediment or vegetation to the point of interference with stormwater conveyance that could lead to localized flooding. Each year County Flood Control Engineers review SMP sites within their watershed and use a combination of professional judgment, local knowledge and available data to assess which sites need maintenance in any given year. Sediment removal activities are conducted when pipes or facilities are blocked to the point of interference with stormwater conveyance. At most of the sites included in this manual, sediment accumulates at pinch points in the channel such as at culvert inlets or outfalls, typically creating a localized effect. For larger channel dredging projects such as Novato Creek, which is not included in this manual, the District employs hydraulic modeling or other measures to evaluate channel capacity.

The number of sediment removal projects undertaken annually, and the quantity of sediment removed each year, depend on the frequency and extent of past maintenance activities and the weather and hydrologic conditions during recent years. Sediment removal requirements are generally greater following a wet winter with higher than usual runoff, slope erosion, and sediment delivery compared to an average or dry winter when sediment yields are less.

Debris, including tires, shopping carts, trash, furniture, and other non-sedimentary deposits, is also removed from creek channels, trash racks and culvert openings. Items are removed from the creek and placed at staging areas by hand and hauled out by dump truck to a certified landfill.

Equipment types, equipment locations, crew sizes, and staging areas vary depending on the need of each site. Equipment typically consists of long-reach excavators, loaders, haulers, wheeled front loaders, vactors, and backhoes. Appendix B lists each sediment removal project site; project dimensions, equipment used, location of equipment, and

expected duration of work. Equipment includes long-reach excavators, backhoes, haulers, and front loaders. Excavated sediment is placed directly into dump trucks, or is placed in or pushed to staging areas, then lifted into the dump trucks.

An updated Appendix J includes an annual site-specific sediment worksheet for sediment removal.

6.2 Maintenance Goals and Triggers

Sediment Removal Goals- Sediment and debris removal activities are implemented to achieve the main goals listed below. Impacts are minimized by implementing the least intensive activities required to meet these goals.

- Maintain stream/channel capacity and/or flood discharge objectives where available
- Maintain or improve unobstructed flow around structures including bridges, storm drain outlets, and pump stations;
- Identify and prioritize stream locations that require sediment and debris removal and maintenance;
- Understand the underlying geomorphic processes at all of the District's maintenance channels to inform and guide appropriate maintenance actions;
- Develop appropriate maintenance target conditions for sites that balances flood protection needs, economizes maintenance activities, and avoids and minimizes environmental impacts;
- Improve water quality conditions through sediment management, including the removal of fine sediments;
- Conduct maintenance that will enhance stream function while minimizing the need for repeat maintenance.
- Provide for the beneficial reuse of sediments where feasible

Sediment Removal Triggers- In general, sediment or debris removal activities are triggered when one or more of the following conditions occur and depend on the specific site (see Appendix K for details):

- The stream or channel is aggrading such that its capacity is compromised or the flood or discharge objective is compromised (if known).
- Accumulated sediment is covering or blocking culvert outfalls and/or other structures, increasing flooding risk
- Accumulated sediment is allowing for excessive plant growth in the channel flow section, increasing risk of flooding and increasing roughness
- Accumulated sediment is reducing fish passage

At each location where sediment removal is planned, the County will begin with an assessment of the types of sediments, fluvial processes, and habitat in the project area in order to evaluate impacts to bed and bank stability within the site and upstream. Pre-project analysis will include a plan to integrate the excavated reach of creek into the dominant geomorphic conditions in the channel if feasible within the County or municipal road right right-of-way (i.e., drops should not be left in the streambed at the upstream edge of excavation when there is a potential to form headcuts that can migrate upstream). The assessment will also identify sorted sediments, such as gravel bars or fines in tidal areas, and consider them for reuse as spawning gravels or wetland surface material. The assessment will also identify the stream's fluvial processes so that the appropriate stream cross section can be excavated, leaving behind a stable channel that optimizes sediment transport.

Geomorphic Coding for Sediment Removal Sites

The SMP endeavors to identify causes for chronic sedimentation in order to develop effective long-term solutions for these sites. To facilitate the understanding of geomorphic process at each of the sediment removal sites, geomorphic codes were developed that describe the different underlying causes of sedimentation. (Table 6-1)

Table 6-1. Geomorphic Codes were developed which describe geomorphic processes that lead to sedimentation and often trigger sediment removal activities.

1	Site is located within an alluvial depositional zone (sudden reduction in channel gradient).
2	Human activity (watershed development, channel confinement, etc.) has caused the site to shift from a transport zone to a depositional zone.
3	Bridges, culverts, and/or related crossings at a site have dimensions that are smaller than the active channel, leading to velocity changes that cause sediment to drop out.
4	Site is at the fluvial-tidal interface and accretes tidally and fluvially-deposited sediment.
5	Site is located at a channel bend where sediments form a point bar.
6	Site is located downstream of episodic sediment delivery (e.g., landslides).
7	Site is located downstream of areas of chronic (terrestrial) sediment delivery (e.g. gullies).
8	Site is in an area where vegetation slows flows and leads to sediment deposition.
9	Site receives sediment from erosion of adjacent channel banks (changes in Width depth ratios).
10	Site is located within an engineered sediment basin.

Project Prioritization to Frequency of Sediment Removal

Understanding and incorporating individual site issues and geomorphic conditions for each site into a programmatic work plan provides the County with a better understanding of the factors influencing the need to do work at each of these sites. With comprehensive

reconnaissance, monitoring, and site condition documentation, the County may be able to eliminate some sites from maintenance status work or identify a project to address the chronic issues, if feasible.

Several of the sediment removal sites have been identified as chronic, largely due to factors which do not allow for comprehensive solutions, such as tidal backwater and/or flat topography. A few chronic sites have been identified for which a capital improvement project may be possible to reduce or eliminate the need for sediment removal. These sites are described below in Table 6-2 below. As part of this program, the District will continue to identify and prioritize sites where chronic sedimentation issues could be improved through infrastructure improvements. Annually, the flood zone engineer will review and recommend sites to be included in either an individual Flood Zone Work Program or integrated into the larger Marin County Public Works Capital Improvement Program (CIP).

Table 6-2. Opportunities to Eliminate or Reduce Sediment Source Contributions and Decrease the Need for Sediment Removal Activities through implementation of a CIP project.

SITE 1-AA/1-BB
A creek bank stabilization project at site 1-AA that was scheduled for 2016 was anticipated to reduce the need for sediment removal downstream at site 1-BB. Though no sediment removal at 1-BB has been needed since 2015, in 2020 continued bank stability issues within 1-AA led to sediment removal within that reach. Hardening the bank in isolated areas could have unintended effects elsewhere in the reach, but it may be that future adjacent property owners decide to initiate such a project in order to save the residential structure. Short of a reach-wide bank stabilization project, which is not likely to ever be funded, there is likely no feasible option to reduce the need for sediment removal. The Flood District's mission is flood control, not bank stabilization, and flood control needs already greatly exceed available funding.
SITE 1-VIN
Installation of a metal baffle may reduce sediment deposition at the Center road outfall downstream of the Center Road Bridge on Vineyard Creek. The Vineyard Creek project was designed and permitted to facilitate sediment removal which typically occurs annually at this location. The fact that sediment accumulates here is partially by design as it historically accumulated in areas that are harder to reach than the bridge. Unfortunately, fish ladders that the District installed downstream have been stripped of smaller gravels so it is hoped that this baffle project will help get the small gravel down to the fish ladders.
SITE 1-NOV-1 (also 1-AA and 1-WAR)
An updated survey and hydraulic model were completed last year to examine whether it is feasible to reduce the sediment removal footprint in this reach (this is done as part of a separate project permit from SMP due to large size). Results showed that sediment removal provides only modest reductions in flood risk. The District will discuss with the advisory board evaluating alternative projects such as pump stations and flood barriers that may provide more benefit than sediment removal (and be done instead of sediment removal). Another project currently being designed is the Deer Island Basin Complex Tidal Restoration Project. While this project would take place downstream of where annual maintenance takes place, it appears this

project may have some minor flood benefits upstream that could supplement local projects to reduce the need for sediment removal.

SITE 1-PAC-3

Repeated flooding at nearby homes in recent years is led to 2022 modifications in the inlet structures to an underground piping system. If funding can be secured, the District would look at the feasibility of daylighting the creek here. By daylighting the creek, flow capacity could be less sensitive to debris. Zone 1 funding sources are not enough to cover the cost of daylighting the creek without a grant.

SITE 3-NHY-1

Sediment removal at Enterprise Concourse on Nyhan Creek is necessary almost every year to maintain flow conveyance under the existing bridge. Unfortunately, concepts to raise the bridge in lieu of sediment removal have been dismissed due to inability to tie an elevated road into the surroundings.

The District, Marin County Parks, and many others, are currently partnering to study Bothin Marsh restoration and sea level rise adaptation alternatives. Some of these may have small positive benefit to the upstream Nyhan Creek flood risk potentially reducing the need for sediment removal.

Coyote Creek and Nyhan creek are regularly surveyed and modeled. Based on the updated modeling, while current sediment levels in through these reaches in the earthen channel portion of the creek prevent the creek from accommodating the U.S. Army Corps of Engineers design 20-year flow (which actually corresponds to a higher water surface elevation than our more recent H&H analysis for a 100-year flood) with the standard freeboard, the benefit of major sediment removal there does not outweigh the cost and therefore major sediment removal in the earthen channel is indefinitely postponed.

SITE 5-EAS-1

There is a history of needing to remove sediment at bridge crossings in this reach in order to minimize flooding of buildings nearby. A modified geomorphic channel was constructed in 2013 in the reach upstream (5-EAS-2) on National Park Service land upstream. The intent was to collect sediment in the constructed geomorphic channel where it can be removed with less impact to habitat. Following construction we completed five years of monitoring sediment levels at the crossings which showed the project at 5-EAS-2 to be effective in preventing the need to remove sediment in 5-EAS-1. The result of that monitoring is we are removing sediment removal as an activity in the SMP in this site and will continue to focus sediment removal on 5-EAS-2 where it can be done in a part of the creek that is dry in the summer. The Bolians Lagoon Restoration Project downstream of Easkoot Creek could potentially have a small positive impact on sediment levels and/or flood risk upstream in Easkoot Creek also.

SITE 7-LAP-1

Historically sediment was removed here when its accumulation rendered the rubber check valve at the end of this pipe inoperable. In 2014 a project to slip-line the stormdrain pipe and extend it out to the deeper and more geomorphically stable section of the creek appears to have been effective thus far in preventing the need for sediment maintenance here. Therefore, this site is being removed from the SMP. Two other potential projects in the watershed that may positively impact the sediment levels here include the McInnis Park Restoration Project and the Gallinas Creek Geomorphic Dredge Project.

6.3 Sediment and Debris Disposal and Reuse

Instream gravel and course sediment along a streambed can be a fundamental habitat element to a healthy functioning stream directly supporting life-cycle needs of fish, amphibians and other aquatic wildlife. When evaluating sites for sediment removal, care is taken to avoid beneficial gravels wherever possible. On Marin County Flood Control District's larger flood control sediment removal projects such as Novato Creek (not included in this manual), the District prepares a sediment reuse plan for the dredge spoils. On these larger dredge projects sediment samples are collected and analyzed in accordance with the Beneficial Reuse of Dredged Material: Sediment Screening and Resting Guidelines (RWQCB 2000). Before reuse of sediment at an instream or wetland restoration site, the testing results are submitted to the RWQCB for review and approval.

The quantities of sediment removed at most of the sites included in this manual are much less than the larger dredge projects. The following describes the conditions applied by the RWQCB for the beneficial re-use of sediments removed as part of the SMP:

a. Excavated sediment may be taken to one of the two Marin County Corporation Yards at Central and West Marin County locations to be re-used as road base in accordance with the following limitations. Sediment re-used for road base shall be placed at least 50 feet away from a surface water body and three feet above groundwater, and then capped with impervious surface to prevent contact with waters of the State.

b. The District may propose alternate beneficial re-use sites besides road base re-use, if and only if, a Sediment Sampling and Analysis Plan (SAP) is submitted and approved by the Executive Officer prior to sediment removal activities. The Sediment Sampling and Analysis Plan shall consist of sediment testing and an evaluation to determine the suitability for disposal or reuse based on sediment chemistry. Sampling frequency shall follow the Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region (DMMO, September 2001). Sediment samples shall be collected and analyzed according to the Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines (SFB-RWQCB 2000), or The Designated Level Methodology for Waste Classification and Cleanup Level Determination (CVRRWQCB, 1989) as appropriate for the proposed disposal or reuse site. Sediment testing results and recommended beneficial re-use site will be submitted to the Regional Water Board for review and approval with the Notification. In general, sediment reuse sites can be characterized into three categories. These categories include (1) onsite reuse, (2) other wetland, channel, or floodplain restoration reuse, and (3) upland agricultural or commercial reuse (dry). The goal is to select disposal options that maximize beneficial reuse of the sediment while minimizing environmental effects.

c. The District shall dispose of any other sediment at a certified landfill and will test materials in accordance with landfill requirements. Proposed sediment disposal, stockpiling, and/or beneficial re-use sites shall be submitted annually to the Executive Officer for review and approval with the Notification.

d. Prior to beneficially re-using sediment for any application other than road base improvements, the District must submit a Sediment Sampling and Analysis Plan, acceptable to the Executive Officer.

Trash debris removed from District channels is taken to one of two places depending on if the debris is non-hazardous or hazardous. Non-hazardous material is taken to the Redwood Landfill. If the debris is hazardous in nature, the material is taken to a permitted hazardous waste facility by a permitted and licensed contractor.

6.4 Frequency and Timing

Sediment removal is not a routine activity but rather is implemented solely on an as-needed basis, where determined by annual field evaluation by County Flood Control Engineers. All sediment removal activities are scheduled to occur during the dry season from June 15th to October 15th, weather permitting. No new sediment removal work shall start after October 15 of any year, but work already underway will continue until October 31 if need be. Examples can be made on a project-by-project basis with the advance approval by the RWQCB Executive Officer and other federal and state regulatory agencies, as appropriate. At each location where sediment removal is planned, the County will begin with an assessment of the types of sediments, fluvial processes, and habitat in the project area in order to evaluate impacts to bed and bank stability within the site and upstream. Pre-project analysis should include a plan to integrate the excavated reach of creek into the dominant geomorphic conditions in the channel (i.e., drops should not be left in the streambed at the upstream edge of excavation with the potential to become headcuts that can migrate upstream). The assessment will also identify sorted sediments, such as gravel bars or fines in tidal areas, and consider them for reuse as spawning gravels or wetland surface material. The assessment will also identify the stream's fluvial processes so that the appropriate stream cross section can be excavated, leaving behind a stable channel that optimizes sediment transport. Appendix B lists each of the sediment removal sites, along with work duration and interval.

6.5 Contractor Details

Most sediment and debris removal maintenance work is performed by DPW road crews, but some tasks are undertaken by CCNB crews (projects less than 25 yd^3), or private contractors. District staff may perform tasks of a smaller duration and extent that don't require full DPW crews. Private contractors are hired for specific tasks requiring skills and/or machinery beyond what District staff and DPW crews possess.

6.6 Conditions for Sediment and Debris Removal

SED-1 The work area boundaries, including access, shall be the minimum required to complete the project.

SED-2 Access routes and staging areas shall be chosen such that disturbance or removal of vegetation is minimized. Any sediment removal activity which removes vegetation shall comply with all conditions for vegetation management as described above.

SED-3 Debris removed from a channel or basin shall be handled, stored and disposed of in accordance with applicable regulatory requirements, and there shall be no discharge of sediment laden water from storage impoundments in violation of applicable water quality standards.

SED-4 To minimize impacts to natural channels, mechanized equipment (e.g., excavators, backhoes) shall be placed on top of bank whenever possible. Prior to the use of mechanized equipment in natural channels, the ECC shall inform the crew leader of the site access routes and work staging locations for the equipment to ensure the least disturbance practicable. Equipment may only be used within the channel when it is dry naturally or the flow dewatered according to activity-specific conditions for dewatering.

SED-5 For most sediment removal projects around bridges, culverts, storm drains, diversion inlets, and natural channels, excavators are used from the roadway and/or top-of-bank.

SED-6 Sediment and natural debris removal from concrete engineered channels shall be limited to 2,800 linear feet, in earthen engineered channels to 800 linear feet, and in natural channels to 600 linear feet of channel. The maximum volume of debris or sediment removal from any site shall be 2,100 cubic yards. Over the 5-year term of the RWQCB Order, sediment removal shall not exceed the program wide cumulative total of 25,000 linear feet and 55,000 cubic yards of sediment and debris. Exceptions to the established limits for maintenance activities may be proposed in the Notification and approved on a case-by case basis if found acceptable to the RWQCB Executive Officer.

SED-7 Sediment and debris removal from an engineered basin is limited to basins less than 2 acres in extent as measured by the area within the basin below the top of bank or, in larger basins, no more than 2 acres in extent of sediment removal (BASMAA).

SED-8 All debris removed shall be taken to a permitted disposal site.

SED-9 For projects around bridges, culverts, storm drains, diversion inlets, and natural channels where the use of excavators from the top-of-bank is not possible, or would cause major vegetation impacts, equipment may be used within the channel when it is dry naturally or the flow dewatered.

SED-10 Gravels, suitable for spawning, will be identified and marked prior to sediment removal. These sediments will be avoided or gathered and set aside to be reapplied at the site after the bulk of sediments have been removed or removed from the site to be stockpiled at an approved location for beneficial reuse in stream restoration or gravel augmentation projects.

6.7 Conditions for Dewatering and Fish Relocation

When maintenance activities occur in flowing streams or open water, the work site must be dewatered and the following conditions will apply:

DEWAT-1 Any work using equipment within the stream channel shall be performed in isolation from the flowing stream.

DEWAT-2 Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.

DEWAT-3 If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.

DEWAT-4 Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.

DEWAT-5 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (NMFS 1997).

DEWAT-6 A filtration/settling system shall be included to reduce downstream turbidity (i.e., filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length.

DEWAT-7 Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.

DEWAT-8 The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.

DEWAT-9 For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials shall be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

7.0 EROSION CONTROL

Erosion control activities are conducted when failing slopes have the potential to interfere with flood control activities and goals.

7.1 Maintenance Goals and Triggers

Erosion control activities are implemented to achieve this goal:

- Stabilizing failing earthen creek banks where biotechnical stabilization techniques are appropriate

Meeting this goal requires a balance between flood control protection needs, water quality, and habitat protection. Impacts are minimized by implementing the least intensive activities required to meet these goals.

In general, bank stabilization activities are triggered by:

- Failing earthen banks that are undermining structures and/or utilities
- Failing earthen banks that are causing increased sediment production and habitat loss.

7.2 Description of Activities

Erosion control activities take place only where the District and/or its partners hold fee title to the land. Most erosion control projects are not prescribed and therefore are not covered under this SMP program. Only those projects where the failing banks are composed of earthen materials and where biotechnical stabilization techniques are used, such as brush mattresses and willow walls, fall under this program. Bio-stabilization methods will be based on accepted guidelines such as those developed by the NRCS4 and the Army Corps of Engineers.

Erosion control tasks under the permit will generally be completed in 2-4 days. Equipment typically used for erosion control work can include excavators, haulers, front loaders, and bulldozers.

7.3 Frequency and Timing

Like other activities covered under the SMP program, erosion control projects are scheduled for the dry season from June 15th to October 15th, weather permitting. These projects are determined on an as-needed basis; if a project is needed, it will be added to the pre-project notification list for the year in which maintenance activities are planned.

7.4 Contractor Details

The District contracts with CCNB to undertake erosion control tasks.

7.5 Conditions for Erosion Control

EROS-1 Any new erosion control projects must incorporate bioengineering or bio-technical designs and shall be limited to "soft" structures, composed of coir or other biodegradable fabric, and/or willow or other plant materials native to the watershed. Native vegetation shall be incorporated into the design where channel design capacity allows.

EROS -2 Length of erosion control activities shall not exceed 150 linear feet.

EROS -3 Any new biotechnical erosion repair activity shall be part of a single and discreet project; implementing contiguous projects in series and in a single calendar year is not approvable under this program.

7.6 Conditions for Dewatering

When maintenance activities occur in flowing streams or open water, the work site must be dewatered and the following conditions will apply:

DEWAT-1 Any work using equipment within the stream channel shall be performed in isolation from the flowing stream.

DEWAT-2 Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.

DEWAT-3 If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.

DEWAT-4 Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.

DEWAT-5 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (NMFS 1997).

DEWAT-6 A filtration/settling system shall be included to reduce downstream turbidity (i.e., filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length.

DEWAT-7 Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.

DEWAT-8 The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.

DEWAT-9 For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

8.0 FACILITIES MAINTENANCE AND REPAIR OF FLOOD CONTROL STRUCTURES

The District needs to maintain its facilities in order to provide flood protection.

8.1 Maintenance Goals and Triggers

Facilities maintenance and repair activities are implemented to achieve this goal:

- Maintain and/or repair flood control facilities to keep them in working order.

Meeting this goal requires a balance between flood control needs, water quality, and habitat protection. Impacts are minimized by implementing the least intensive activities required to meet these goals.

In general, facilities maintenance and repair activities are triggered when one or more of the following conditions occur:

- Facilities are damaged or deteriorating such that their function is impaired or no longer functioning as intended
- Facility or its components are at the end of expected design life
- Facilities' maintenance intervals have been reached

8.2 Description of Activities

Flood control structures are defined to include all structures built or maintained by the District, including, but not limited to, weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. The maintenance, repair or rehabilitation of flood control structures will not exceed 100 lineal ft. upstream or downstream of each structure. Some vegetation will be cut to maintain facility function and/or allow access to the facility but this only applies to a few locations and not every year. For example, Lynwood pump station is located at the edge of a stormwater detention pond and at the base of a levee. Each of its four pumps is removed for servicing on a 6-year staggered cycle. Before the cranes come to remove each pump, a small amount of cattails growing in front of the pump station is trimmed to allow access.

8.3 Frequency and Timing

Maintenance of flood control structures is scheduled to occur during the dry season from April 15th to October 15th, weather permitting. Some structures, such as tidegates, need annual maintenance; others, such as pump station inlets and outlets, may be maintained

on an as-needed basis. Any instream maintenance will occur from June 15th to October 15th.

8.4 Contractor Details

Some structure maintenance work is performed by DPW road crews, but some tasks are undertaken by CCNB (such as clearing trash racks) or private contractors, depending on required skills, equipment, and/or availability.

8.5 Conditions for Maintenance of Structures

MAIN-1 Maintenance activities shall not result in an increase in the facility footprint[1] unless essential to stabilize the channel.

MAIN-2 This activity covers in-kind replacement of flood control structures with structures of the same dimension, or with minor deviations in dimension, configuration or alignment[2]. Any increase in dimension square footage by plan view will be mitigated at a ratio of 3:1, such as by creating and/or improving habitat and planting native plants. Work is not to exceed 100 linear feet upstream or downstream of said structure.

MAIN-3 When maintaining or repairing an engineered sediment basin, there shall be no discharge of sediment or other pollutants downstream.

MAIN-4 Maintenance or repair shall only re-establish pre-existing conditions (including as-built conditions); no significant expansion of capacity is allowed by this program.

When maintenance activities occur in flowing streams or open water, the work site must be dewatered and the following conditions will apply:

DEWAT-1 Any work using equipment within the stream channel shall be performed in isolation from the flowing stream.

DEWAT-2 Cofferdams used to divert water shall be constructed with clean river gravel in burlap sacks and sealed with sheet plastic.

[1] Facility footprint is defined as the spatial extent of the constructed and artificial elements of the structure and the associated accessway

[2] Minor deviation is defined as equal to or less than 5% spatial variance from the original structure, e.g., a 500 sq. ft. structure could be replaced by a 525 sq. ft. structure.

DEWAT-3 If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.

DEWAT-4 Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.

DEWAT-5 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (NMFS 1997).

DEWAT-6 A filtration/settling system must be included to reduce downstream turbidity (i.e., filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe shall discharge onto the top of bank into a densely vegetated area, which may require extra hose length.

DEWAT-7 Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.

DEWAT-8 The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.

DEWAT-9 For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

9.0 LEVEE MAINTENANCE AND REPAIR

The District needs to maintain its levees in order to provide flood protection.

9.1 Maintenance Goals and Triggers

Levee maintenance activities are implemented to achieve these main goals:

- Stabilizing levees
- Controlling burrowing rodent populations

Meeting these goals requires a balance between flood control protection needs, water quality, and habitat protection. Impacts to streamside habitat are minimized by implementing the least intensive activities required to meet these goals.

In general, levee maintenance activities are triggered when one or more of the following conditions occur:

- Plant growth on levee roads impedes safe passage to flood control facilities
- Levees are eroding and/or settling, requiring additional fill materials to bring levee up to original height and no higher
- Burrowing mammals are damaging the stability of levees

The need for levee maintenance activities is unlikely if none of these trigger conditions are present.

9.2 Description of Activities

Levee maintenance includes mowing levee tops and banks above the high water line for fuel reduction, stabilizing levees by placing fill on the levee tops, and controlling burrowing rodent populations.

Levee stabilization may occur on any levee maintained by the District; landowner access will be required for activities at site 7-GAL on the Santa Venetia levee, which is private property.

If a gopher infestation occurs, the gophers are trapped and their burrows are filled with an earth/concrete mix or bentonite, following FEMA guidelines (FEMA 2005). The County of Marin does not use rodenticides or other poisons in rodent control for levee maintenance or in any other SMP activity.

9.3 Frequency and Timing

Levee maintenance activities are scheduled to occur during the dry season from April 15th to October 15th, weather permitting. Sites are treated annually for fuel reduction mowing, and on an as-needed basis for stabilization and rodent control.

9.4 Contractor Details

Most levee maintenance and repair work are performed by DPW road crews, but some tasks are undertaken by CCNB or private contractors. District staff may perform tasks of a smaller duration and extent that don't require full DPW crews. Private contractors may be hired for specific tasks requiring advanced skills beyond what District staff and DPW crews hold.

9.5 Conditions for Levee Maintenance

LEVEE-1 Maintenance activities on levees shall not result in disturbance to the subgrade of the levee banks or top. Bottom and surface disturbance shall be kept to the minimum necessary to complete the work and shall not result in erosion of or additional sedimentation into the channel or adjacent wetland or marsh.

LEVEE- 2 No pesticides or rodenticides shall be used in the control of rodents on flood control levees within the SMP project area.

LEVEE-3 All traps set for rodent control on levees shall be set near the crown of the levee and never in the adjacent marsh or stream channel. No traps shall be set more than two ft. below the crown on the marsh side of a levee.

LEVEE-4 After rodents are trapped and removed, burrows will be filled with an earth/concrete mix, bentonite, or other similar fill material to deter re-infestations.

LEVEE-5 If the burrow network is extensive, backhoes may be used to uncover the burrows and then repack the earth to eliminate the potential for piping of water through the levees through the burrows.

10.0 PROGRAM MANAGEMENT

This chapter describes the components of the annual work cycle and describes how the District will implement the maintenance program in the field. This section also includes a long term monitoring program that will collect data that can be used to inform maintenance priorities over time and direct projects into the County's Capital Improvement program where applicable.

10.1 Annual Work Cycle

The District will implement the SMP in an annual work cycle, to include project planning, pre-project notification, project implementation, and annual reporting. A Watershed Planner, Natural Resources Planner, Creek Naturalist, or Operations & Maintenance Engineer will oversee the SMP program, including preparing the documents required by the program

Project Planning, Reconnaissance and Site Selection

Maintenance activities included in this manual are never implemented in a simple routine manner, such as on an annual basis. Instead, creek maintenance activities are conducted only when culverts, channels or facilities have been examined by Flood Control Engineers and are found to be blocked by sediment or vegetation to the point of interference with conveyance of stormwater. The number of maintenance projects undertaken annually, and the quantity of sediment and vegetation removed in a given year depend on the frequency and extent of past maintenance activities and the weather and hydrologic conditions during recent years. Channel maintenance requirements are generally greater following a wet winter with higher than usual runoff or at locations where maintenance has not been performed for several years.

In general, vegetation maintenance is triggered when one or more of the conditions listed below occur. The need for vegetation management activities is unlikely if none of these trigger conditions are present.

- Vegetation growth is collecting debris in a matter that is significantly decreasing flood conveyance capacity
- Vegetation growth impedes access to channels and flood control facilities
- Excessive vegetation growth constitutes a fire hazard to District and private property
- Nonnative invasive plant species are reducing the success of native vegetation
- Live trees are creating excessive hydraulic roughness or dead/dying trees are reducing stream capacity and/or creating a safety hazard.

In general, sediment or debris removal activities are triggered when one or more of the following conditions are observed by the Flood Control Engineer in their annual review of potential maintenance sites:

- Accumulated sediment is covering or blocking culvert outfalls and/or other structures, increasing flooding risk
- The stream or channel is aggrading such that capacity is compromised or the flood or discharge objective is compromised (if known).
- Accumulated sediment is allowing for excessive plant growth in the channel, increasing risk of flooding and possibly causing undue roughness
- Accumulated sediment is reducing fish passage

Each year County Flood Control Engineers review SMP sites within the Flood Control Zones within their jurisdiction and use a combination of professional judgment, local knowledge and available data to assess which sites need maintenance in any given year. Data collection which informs this decision includes annual updating of the site assessment worksheets to document localized sediment conditions at points of aggradation such as culvert outfalls, and flow blockages such as log jams. Sediment accumulation is also tracked through the use of the geomorphic coding system, which explains why sediment accumulates in these locations and helps to guide long term solutions for chronic sediment sources (Table 6-2).

The District's larger flood control channel dredging projects are not included in this manual (i.e. Novato Creek). On these larger projects the District does employ analytical tools to evaluate channel capacity relative to flow using stream flow and discharge data. However, at most of the sites included in this manual, sediment accumulates at pinch points in the channel such as at culvert inlets or outfalls, typically creating localized effects that are not reflective of capacity that would be measured by a larger channel modeling exercise using flow and discharge data.

At each location where sediment removal is planned, the County flood control engineers will begin with an assessment of the types of sediments, fluvial processes, and habitat in the project area to evaluate impacts to bed and bank stability within the site and upstream. Pre-project analysis will include a plan to integrate the excavated reach of creek into the dominant geomorphic conditions in the channel (i.e., drops should not be left in the streambed at the upstream edge of excavation with the potential to become headcuts that can migrate upstream). The assessment will also identify sorted sediments, such as gravel bars or fines in tidal areas, and consider them for reuse as spawning gravels or wetland surface material. The assessment will also identify the stream's fluvial processes so that the appropriate stream cross section can be excavated, leaving behind a stable channel that optimizes sediment transport.

Several of the sites have been identified as chronic, often due to factors which do not allow for comprehensive solutions, such as tidal backwater and/or flat topography. A few chronic sites have been identified for which permanent solutions may be possible which could reduce or eliminate the need for sediment removal. These sites are described in Table 6-2. As part of this program, the District will continue to identify and prioritize sites where chronic sedimentation issues could be improved through infrastructure improvements. Where feasible, sites will then be included in either an individual Flood Zone Work Program or integrated into the larger Marin County Public Works Capital Improvement Program (CIP).

By May 1st of each year, the District will provide written pre-project notification of proposed maintenance activities for the upcoming season to the permitting agencies. The notification will be in the form of a list of each project site and area, and type of activity (vegetation management, sediment removal, erosion control, facilities maintenance, and levee maintenance). For sediment sites pre-project notification will also include SMP pre-project worksheets for each SMP site along with pre-project photographs. During the pre-project notification, each site with chronic and recurring removal of LWD, sediment, and/or vegetation shall be assessed for potential adjustment to the maintenance activities or inclusion in the CIP program, to achieve a more permanent solution to the problem. Additional work may be submitted upon discovery if it meets the criteria established for maintenance as described in Chapter 5 and is not located where conditions affecting fish and wildlife resources on the site have substantially changed, or where such resources would be adversely affected by the proposed maintenance activity.

Project Implementation

The general work window for SMP activities extends from April 15th to October 15th, with most of the work being performed between July 1st and October 15th. Exceptions are noted in Chapter 3. Dry years may mean a longer work season; wet weather may halt the work season early. Work that happens before July 1st usually consists of mowing of levees and does not include any instream work.

The SMP is complex; at any one time during the work season, different work activities may be occurring at several sites, with several different contractors. In all cases, all prescribed maintenance activities will be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality.

Work at each site will be scheduled around relevant species' work windows (Table 3-1) whenever possible to avoid impacts, and pre-construction surveys to locate special status species will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of minimization measures. A suite of general and activity-specific conditions and species-specific Avoidance

and Minimization Measures (AMMs) apply to the SMP and are described in Chapter 3. In addition, Best Management Practices (BMPs) are prescribed, depending on activity type, site location, species presumed to be present, work windows, and other conditions. Appendix F contains the BMPs.

Annual Reports No later than February 15th of each year, the District will provide annual reports to the permitting agencies, describing the work completed during the previous season. The annual reports shall include at a minimum:

- A description of maintenance activities and both pre and post work photographs of each SMP site or general project area where maintenance activities were conducted during the previous year;
- Maintenance activities will include linear feet and cubic yards of sediment removed per site and linear feet of vegetation removed;
- A table with the number of trees removed, including species, size, and whether the tree was alive or dead;
- A table of any large woody debris removed or preserved, an update each year if preserved, and if in a salmonid creek;
- Description of non-native plants removed, including the species removed;
- Mitigation implemented, including the number, species, and container size of trees planted, square feet of non-native plants and trash removed;
- Monitoring results for each project;
- A description of any lessons learned and recommendations to update BMPs identified in the SMP Manual, as needed.

10.2 Data Collection, Management and Program Tracking

Data collection and monitoring efforts are critical to measuring the success of program implementation. The District currently maintains an extensive GIS database from which the maps included in this manual were generated. Both quantitative and observational data is stored in Microsoft Excel and Access tables and databases with links to the GIS database. Data or documentation of the maintenance projects are entered into the database during each cycle of the work plan. The database can be queried to chronicle past maintenance activities or prioritize future actions. The maintenance database is an important tool for the stream maintenance manager and contains technical information to compile the agency notification packages and annual reports. The database will include checklists to

ensure all conditions of programmatic permits are met. The regulatory agencies will receive necessary information on maintenance activities based on the permit requirements and the description of activities in this manual. Information saved in the database will also provide insight into future Manual updates.

To properly track the progress of management activities towards achieving the maintenance program's goals and compliance with programmatic permit conditions, these databases will be upgraded and integrated as the stream maintenance program adapts to best meet the stream maintenance goals.

The following data are collected for the program:

- GIS reach mapping
- BMP tracking
- Pre- and post-project photos
- Channel geomorphic characterizations
- Annual maintenance notes documenting triggers
- Special status species mapping
- Invasive species locations
- Specific data required by permits
- Pre-project notification packages
- Annual reports

Appendix I describes the assessment data fields that are filled out during inspection and maintenance. This data collection app will constitute our primary method for gaining additional field data about the SMP sites. Data collected will be used to quantify the need for maintenance, will monitor and document site conditions over time. Over the initial permit period, the District will monitor the data collected via this app and will make adjustments as necessary to continue to fine tune the District's data collection efforts to support its information needs. The final report will be developed using a combination of pre-project reconnaissance data, pre-project biological data and implementation data including the photo monitoring and final reports.

10.3 Five-Year Program Review

Every five (5) years, the District and the relevant regulatory agencies will review the stream maintenance program for its overall effectiveness. This review will include an assessment of maintenance activities conducted to date, AMMs and BMPs employed, data management, adequacy of adaptive updates and revisions to the manual, and overall program coordination and communication between the District and the regulatory agencies. The stream maintenance manager will collect and organize the above review information and provide a summary report to the regulatory agencies. These findings will be discussed with regulatory agencies as part of the permit renewal process. As a result of

these discussions, potential program changes or updates shall be integrated into the Manual through an addendum or revision process. The updated Manual will be redistributed to regulatory agencies and program partners. Program changes or updates made at the 5-year reviews may require additional California Environmental Quality Act (CEQA) review. Manual revisions may also require an updating of permit terms, which would occur through a collaborative process between the District and the relevant permitting agencies.

10.4 Contractor Training

Proper training of partners and contractors is essential to the success of the SMP in avoiding and minimizing environmental impacts. Training needs vary by contractor and are described below.

DPW Road Crews

- District staff will work with DPW road crews prior to implementing activities covered by the SMP. The ECC will ensure that the Roads Maintenance Supervisors and staff understand their responsibilities for implementing all required general and activity-specific conditions and AMMs. The contractor will be responsible for making sure that the work crews have the materials they need in order to implement all necessary AMMs and BMPs prior to, during and post-construction.

- Maintenance Supervisors and crew members receive periodic training focused on protecting and enhancing aquatic habitats while conducting prescribed road maintenance. Training is based on materials covered in the manual developed by FishNet 4C specifically for county road crews, entitled: Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance. Over the past few years, staff have participated in the following FishNet 4C workshops:

1) Overview of FishNet 4C Roads Manual (2006)
2) Erosion Control & Sediment Management BMPs (2007)
3) Ditch Maintenance/Vegetation Management BMPs (2008)
4) Biotechnical bank stabilization BMPs (2009/10)

CCNB

- District environmental staff will provide an annual training session for all CCNB staff that describes the type and timing of work that will be implemented; potential special status species, their habitats, and associated AMMs, and BMPs to be implemented.

- Prior to commencement of any maintenance activity, District environmental staff will determine the appropriate measures to implement prior to, during and post-activity.

The ECC will work regularly with the CCNB Maintenance Supervisor to review work orders to ensure that the Supervisor and their crews implement the prescribed measures needed at each site and for each type of activity.

- Prior to beginning work at each site, the ECC will meet with the CCNB Maintenance Supervisor on site to review the Site Fact Sheet and to ensure that the Maintenance Supervisor understands and is able to comply with the types of AMMs and BMPs prescribed for that site.

- CCNB provides its corps members one day per week of field and classroom instruction on natural resource and science-based topics related to their work, such as watershed ecology, aquatic resources, and identification of local flora and fauna. Corps members may earn credits toward their GED or High School Equivalent diplomas.

STRAW (Students and Teachers Restoring a Watershed)

- Restoration activities are preceded by classroom presentations given by STRAW in partnership with MCSTOPPP. Students learn about the characteristics of the particular watershed in which they will work; the original habitat of the site and how it has been impacted by development, urban runoff, and invasive plant species; and the benefits of restoration.

- On the day of the restoration project, students, teachers, and parent volunteers are trained for the specific activities at the site. Invasive plant removal includes identification of both the invasive weed and other similar native plants. The best techniques are shared, and students focus on small areas to clear the entire site prior to moving to another site. Planting steps are demonstrated and students are encouraged to request a visual check by staff at several keys steps to ensure plant survival.

- STRAW restorations are designed for an 80% plant survival rate. Plants are maintained by STRAW staff for a three-year establishment period, and the project team adaptively manages project sites by identifying site specific variables that contribute to plant mortality.

Independent Contactors

- District environmental staff will work with outside contractors prior to implementing activities covered by the SMP. The ECC will ensure that the County Maintenance Supervisors and staff understand their responsibility for implementing all required general and activity-specific conditions and AMMs. The ECC will be responsible for ensuring that the contractors understand what materials they need to have in hand in

order to implement all necessary AMM's and BMPs prior to, during and post-construction.

- Companies contracting with the County of Marin for SMP activities will be held to standards described in the Specifications that are included in their County contracts.

Municipal Partners

District environmental staff will work with its municipal partners prior to their implementing activities covered by the SMP. The ECC will ensure that Maintenance Supervisors and municipal staff understand their responsibility for implementing all required general and activity-specific conditions and AMMs. The ECC will be responsible for ensuring that municipal staff understand what materials they need to have in hand in order to implement all necessary AMM's and BMPs prior to, during and post-construction.

11.0 REGULATORY COMPLIANCE

This chapter describes the steps that the District has taken to fulfill all California Environmental Quality Act (CEQA) and environmental permitting requirements. In preparation for the completion of CEQA review of the program and permit applications, the District conducted a Biological Assessment (Appendix E) of SMP activities and their potential to impact sensitive resources within the geographic scope of the project. The Biological Assessment (Appendix E) is the guiding document for the Avoidance and Minimization Measures set forth in order to protect important habitat and special status species during the implementation of stream maintenance activities.

11.1 CEQA Compliance

The District is the lead agency for CEQA review of this program. In 2007, the District prepared an Initial Study for West Marin, which was circulated according to CEQA guidelines. The District took comments and filed a Negative Declaration of Environmental Impact. The Notice of Determination (State Clearinghouse # 2007-092065) was filed in October 2007. An Addendum was filed in March 2013, modifying a project site.

In 2012, the District prepared an Initial Study for East Marin, which was circulated according to CEQA guidelines. The District took comments and filed a Mitigated Negative Declaration of Environmental Impact. The Notice of Determination (State Clearinghouse # 2012-022053) was filed in June 2012. In April 2014, the District amended the Mitigated Negative Declaration to add several new sites and change parameters of several other existing sites.

All CEQA documents can be found in Appendix G.

11.2 California Department of Fish and Wildlife

In October 2012, the District entered into a Routine Maintenance Agreement (RMA) (Notification No. 1600-2012-0207-R3) with the California Department of Fish and Wildlife to obtain permitting coverage and terms for the District's most common maintenance needs. The first work season under the permit was 2013, with an expiration date of December 31, 2016. The permit was amended in both 2013 and 2014. The amendments included adding one additional sediment site in 2013 and adding 21 new sites and additional flood control activities to seven existing sites in 2014 (see below for more details). In 2017, the permit was extended to December 31, 2020. The permit was also amended in 2017, which included adding two new sites, adding an additional activity to one site, increasing the length of sediment removal at one site, and expanding one activity (see below for more detail). This District received a 20-year permit in 2021 (Notification No. 1600-2021-0018-R3). This permit will expire on December 31, 2041, with a status report due every four years.

11.3 Regional Water Quality Control Board

The Regional Board issues 401 Water Quality Certifications and Waste Discharge Requirements for Marin County's flood control maintenance activities. Under the Clean Water Act (CWA Section 401), applicants for a federal 404 US Army Corps of Engineers (USACE) permit to conduct activities that may result in the discharge of dredged and fill materials into surface waters of the United States (including wetlands) must obtain Section 401 Water Quality Certification from the State so that any such discharge will comply with the applicable provisions of the CWA. For sites located outside ACOE jurisdiction of waters of the U.S. but within waters of the State, the Regional Water Quality Control Board issues Waste Discharge Requirements for activities involving sediment or debris removal, large woody debris management, erosion control, and vegetation management within the channels as part of maintenance activities.

In 2017, the District obtained a Waste Discharge Requirements and Water Quality Certification (Order No. R2-2017-0028) from the California Regional Water Quality Control Board – San Francisco Bay Region. The permit expired on December 31, 2022. The District is currently working to include Marin County's SMP into their regional permit.

11.4 U.S. Army Corps of Engineers (USACE)

Several of the sediment removal sites are situated below the ordinary high water mark (OHWM) of stream channels that require dewatering for maintenance activities to be implemented or along the SF Bay edge in wetland conditions. These sites fall within the jurisdiction of the U.S. Army Corps of Engineers (USACE) and will require coverage under Clean Water Act 404 Nationwide permits or a Regional General Permit. The District will pursue a permit with USACE when a project falls within USACE jurisdiction.

11.5 Other Agencies

U.S. Fish and Wildlife Service/NOAA-National Marine Fisheries Service

If USACE determines that maintenance at a project site has the potential to affect a threatened or endangered species or critical habitat under Section 7 of the Endangered Species Act, the USACE will initiate consultation with the appropriate federal wildlife agency: U.S. Fish and Wildlife Service (USFWS) for terrestrial species and their habitats; or the National Marine Fisheries Service (NMFS) for protected marine and aquatic fish species and habitats.

The consultation could be formal or informal to address the effects of the project. In some cases, a Biological Opinion with "incidental take" provisions will be distributed from USFWS to USACE for inclusion in the permit.

Bay Conservation and Development Commission (BCDC)

The Bay Conservation and Development Commission (BCDC) regulates placement of fill, dredging activities, and development activities along the bay edge. Some of the sediment removal activities will occur within the jurisdictional areas of BCDC. The District will pursue these permits when a sediment project falls within BCDC jurisdiction.

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APPENDIX A

MASTER LIST OF PROJECT AREAS AND SITES

Marin County Flood Control-Stream Maintenance Program Master Site List-2023

Blue = Large sediment removal projects not included in SMP

											Permits					Vegetation Maintenance										Facilities					Plant Community					Special Status Plants						Special Status Wildlife								
Site ID	Vegetation Project Area (CDFW)	Map # 2021	Creek	Location Description	Site Location Notes	Vegetation Maintenance	Sediment removal	Tidal Character	Substrate	Channel Type	RWQCB WDR/401	DFW 1600 RMA	USACE Permit Needed	Special Status Species	Partner	Fire fuel reduction on top of bank	Duration of Work	Limb and trim top of bank and side slopes of channel	Remove vegetation within channel bottom	Clear trash and debris from creek	Remove fallen trees	Hazard tree removal	Remove invasive non-native plants	Revegetation with native plant species	Cattail cutting	Erosion Control	Pump Station	Tide gate	Trash Rack	Levee Maintenance	California annual grass-land	Northern coastal salt marsh	Diked Bay-lands	North coast riparian scrub/ forest	Mixed evergreen forest	Pt. Reyes bird's beak	Hayfield tarweed	Marsh micro-seris	Marin knot-weed	White-rayed pentach aeta	Coho	Steel head	Monarch butterfly	CA red-legged frog	North west-ern pond turtle	CA Ridg way's rail	CA black rail	Salt marsh harvest mouse	Bat ssp	Northern spotted owl
FLOOD CONTROL ZONE 1 - NOVATO																																																	
1-AA-1	Arroyo Avichi	2	Arroyo Avichi	Novato Creek to culvert at Novato Blvd	End of pipe to Novato Creek	X		Tidal	Earthen	Engineered	Yes	Yes	N/A		MCFCWCD		1-2	X	X	X	X	X	X					X						X																	
1-AA-2	Arroyo Avichi	2	Arroyo Avichi	US of bypass to 1575 Indian Valley Rd	US of bypass to 1575 Indian Valley Road	X	X	Non-tidal	Earthen	Modified	Yes	Yes	No		MCFCWCD		2-3	X	X	X	X	X	X			X								X																
1-ASJ-1	Arroyo de San Jose Lower Complex	3	Arroyo de San Jose	Pacheco Pond to Hwy 101	Pacheco Pond to Hwy 101	X		Non-tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD	X	2-3	X	X	X	X	X	X			X								X						X											
1-ASJ-2	Arroyo de San Jose Upper Complex	3	Arroyo de San Jose	Hwy 101 to silt basin US of Ignacio Blvd	101- Ignacio Blvd; inc silt basin	X	X	Non-tidal	Concrete	Modified	Yes	Yes	Yes	X	MCFCWCD	X	2	X	X	X	X	X	X			X								X						X										
1-ASJ-3	Arroyo de San Jose Upper Complex	3	Arroyo de San Jose	Ignacio Blvd to Birdie Dr	Ignacio Blvd US to Birdie Dr	X		Non-tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD		2	X	X	X	X	X	X	X		X								X						X											
1-BB-1	Baccaglio Basin	2	Baccaglio Basin	Baccaglio Basin		X	X	Non-tidal	Earthen	Modified	Yes	Yes	No		MCFCWCD	X	2	X	X	X	X	X	X		X	X									X																
1-BB-2	Baccaglio Basin	2	Baccaglio Basin	Baccaglio Bypass; Arroyo Avichi trash rack to Basin	Baccaglio Basin US to AA trash rack	X		Non-tidal	Concrete	Modified	Yes	Yes	N/A		MCFCWCD	X	2	X	X	X	X	X	X			X								X																
1-CHE-2	Cheda Creek Upland	2	Cheda Creek	Novato Blvd to Cowbarn Ln	Novato Blvd to Cowbarn Ln	X		Non-tidal	Earthen	Modified	Yes	Yes	N/A		MCFCWCD		1-2	X	X	X	X	X	X		X	X								X																
1-IGN	Arroyo de San Jose Upper Complex	3	Ignacio Creek	Ignacio Blvd to College of Marin campus		X		Non-tidal	Earthen	Modified	Yes	Yes	N/A		MCFCWCD	X	2-3	X	X	X	X	X	X			X								X																
1-LYC	Lynwood Creek	2	Lynwood Creek	Off Rowland Blvd	Off Rowland Blvd	X		Non-tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD	X	1-2	X	X	X	X	X	X		X	X								X												X				
1-LYS	N/A	2	Lynwood Slough	Behind Vintage Oaks Shopping Center at Lynwood Pump Station	Behind Vintage Oaks mall			Non-tidal	Earthen	Modified	Yes	Yes	N/A		MCFCWCD	X										X	X		X	X	X																X				
1-NMWD-1	N/A	4	Novato Creek	Novato Creek at Jim Grossi Ranch US of Stafford Lake			X	Non-tidal	Earthen	Modified	Yes	Yes	No		NMWD		2-3																																	
1-NMWD-2	N/A	4	Trib to Stafford Lake	Tributary to Stafford Lake near Indian Valley Golf Course			X	Non-tidal	Earthen	Modified	Yes	Yes	No		NMWD		1-2																																	
1-NOV-1	Novato Baylands	2	Novato Creek	Mouth to Redwood Blvd	Mouth of Novato Ck to Redwood Blvd	X		Tidal	Earthen	Engineered	Yes	Yes	N/A	X	MCFCWCD	X	3-4	X	X	X	X	X	X			X	X	X		X		X												X		X	X	X	X			
1-NOV-2	Upper Novato Creek Area	1	Novato Creek	Redwood Blvd to upper tidal extent	Redwood Blvd to upper tidal extent	X		Tidal	Earthen	Engineered	Yes	Yes	N/A	X	MCFCWCD		2-3	X	X	X	X	X	X			X								X												X					
1-NOV-3	Upper Novato Creek Area	1	Novato Creek	Above tidal extent to Thorsen Ct	Above tidal extent to Thorsen Ct	X		Non-tidal	Earthen	Engineered	Yes	Yes	N/A	X	MCFCWCD, STRAW		3-4	X	X	X	X	X	X	X		X								X												X					
1-NOV-SR	N/A	n/a	Novato Creek	Novato Creek Sediment Removal							NO	NO																																				
1-PAC-1	Arroyo de San Jose Lower Complex	3	Pacheco Creek	Pacheco Pond to Hwy 101	Pacheco Pond to 101	X		Non-tidal	Earthen	Modified	Yes	Yes	N/A		MCFCWCD	X	2-3	X	X	X	X	X	X			X								X																
1-PAC-2	Pacheco Creek Upland Complex	3	Pacheco Creek	Hwy 101 to 99 Pacheco Creek Dr.		X		Non-tidal	Earthen	Modified	Yes	Yes	N/A		MCFCWCD		2-3	X	X	X	X	X	X			X								X																
1-PAC-3	Pacheco Creek Upland Complex	3	Pacheco Creek NF	Parallel to Oak Forest Rd	Pacheco Creek tributary	X		Non-tidal	Earthen	Engineered	Yes	Yes	N/A		MCFCWCD		1	X	X	X	X	X	X											X																
1-RUSH	Rush Creek	1	Rush Creek	N of Railroad Ave to Binford Rd (excluding Caltrans ROW)	N of Olive Ave, end of Railroad Ave to Caltrans ROW; culvert outfalls east of Binford Rd (Vegetation only)	X	X	Tidal	Earthen	Modified	Yes	Yes	Yes	X	MCFCWCD	X	1-2	X	X	X	X	X	X					X						X						X	X	X	X							
1-SMC	Upper Novato Creek Area	1	San Marin Creek	Between Leese Ln and Driftwood Ave	Btwn Leese Ln and Driftwood Ave	X		Non-tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD		2-3	X	X	X	X	X	X											X																
1-SRC	Upper Novato Creek Area	1	San Ramon Creek	Between shopping center and Poplar Dr	Btwn shopping center & Poplar Dr	X		Non-tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD	X	2-3	X	X	X	X	X	X											X											X					
1-VIN	Novato Creek Tributaries	1	Vineyard Creek	US to 2590 Vineyard Rd		X	X	Non-tidal	Earthen	Engineered	Yes	Yes	No	X	MCFCWCD, STRAW	X	2-3	X	X	X	X	X	X	X		X								X											X					
1-WAR-1	Novato Creek Tributaries	1	Warner Creek	Novato Creek to Diablo Ave	Diablo Ave to confluence w/Novato Ck	X		Tidal	Earthen/Concrete	Engineered	Yes	Yes	N/A	X	MCFCWCD		2	X	X	X	X	X	X			X								X											X					X
1-WAR-2	Novato Creek Tributaries	1	Warner Creek	Diablo Ave to confluence with Vineyard Creek	Confluence w/Vineyard Cr to Diablo Ave	X		Non-tidal	Earthen	Engineered	Yes	Yes	N/A	X	MCFCWCD	X	2-3	X	X	X	X	X	X	X		X								X											X		X			
1-WIL	Novato Creek Tributaries	1	Wilson Creek	Warner Creek confluence to 630 Wilson Ave		X		Non-tidal	Earthen	Modified	Yes	Yes	N/A		MCFCWCD	X	2-3	X		X	X	X	X	X		X								X																
FLOOD CONTROL ZONE 3 - RICHARDSON BAY																																																
3-BM	N/A	11	Bothin Marsh	E. Blithedale Ave at Roque Moraes Dr	btwn bike path & E Blithedale Ave - Bothin Marsh		X	Tidal	Earthen	Modified	Yes	Yes	Yes	X	MCFCWCD		1-2																	X					X								X	X			
3-COY-SR	N/A	n/a	Coyote Creek	Coyote Creek Sediment Removal Shoreline Hwy to DS end of concrete channel							NO	NO																																				
3-COY-1	N/A	12	Coyote Creek	Shoreline Hwy to start of concrete channel	Coyote Creek; Shoreline Hwy to start of concrete channel			Tidal	Earthen	Engineered			Yes	X	MCFCWCD	X	1-2									X		X		X			X												X	X	X			
3-COY-2	Zone 3	12	Coyote Creek	Start of concrete channel to Laurel Way	Beginning of Concrete Channel to Laurel Way	X	X	Tidal	Concrete	Engineered	Yes	Yes	Yes		MCFCWCD		2	X		X	X		X			X		X						X																
3-COY-3	Zone 3	12	Coyote Creek	Laurel Way to US of Ash St	Concrete channel from Laurel Way to Maple Ave	X	X	Non-tidal	Concrete	Engineered	Yes	Yes	Yes		MCFCWCD		1	X		X	X		X			X		X						X																
3-COY-5	Zone 3	12	Coyote Creek South Fork	450-456 Marin Ave; upstream of south fork inlet	Upstream of south fork inlet	X		Non-tidal	Earthen	Modified	Yes	Yes	No		MCFCWCD		1	X		X	X		X											X																
3-CRE-1	N/A	12	Crest Marin Creek	Flamingo Rd to Ross Dr	Birdland Access Stretch		X	Non-tidal	Earthen	Modified	Yes	Yes	No		MCFCWCD	X	2			X							X	X			X																		
3-CRE-2	N/A	12	Crest Marin Creek	End of Laurel Way	(concrete) and natural channel		X	Non-tidal	Earthen/Concrete	Modified	Yes	Yes	No		MCFCWCD		1-2																			X	X														
3-MIL-1	N/A	11	Miller Ave drainage	Just S of Miller Ave/Camino Alto intersection	North outfalls; earth & concrete		X	Tidal	Earthen/Concrete	Modified	Yes	Yes	Yes	X	MCFCWCD		2-3																	X												X	X	X			
3-MIL-2	N/A	11	Miller Ave drainage	E side of Miller Ave across from Tamalpais HS	from Tamalpais HS; not concrete-lined		X	Tidal	Earthen	Modified	Yes	Yes	?	X	MCFCWCD		1																	X												X	X	X			
3-MIL-3	N/A	12	Miller Ave drainage	Across from Tamalpais HS track between Miller Ave and Bothin Marsh multiuse path	Almonte Blvd and Miller Ave		X	Tidal	Earthen	Modified	Yes	Yes	Yes	X	MCFCWCD		2-3																	X					X								X	X	X			
3-NYH-1	N/A	12	Nyhan Creek	Nyhan Creek - near intersection of Enterprise Concourse w/ Tenn. Valley Road	Nyhan Creek at Enterprise Concourse		X	Tidal	Earthen	Engineered	Yes	Yes	Yes		MCFCWCD	X	1-2	X	X	X	X	X	X			X										X																
3-NYH-2	N/A	12	Nyhan Creek tributary	Channel behind Tamalpais Valley Elementary School	Tamalpais Valley Elementary School Channel		X	Non-tidal	Concrete	Engineered	Yes	Yes	No		MCFCWCD		1	X	X	X	X	X	X													X																
3-REED-1	N/A	11	Reed Creek	ACMP confluence US approximately 200 ft	Presidio (private property)		X	Tidal	Earthen	Modified	Yes	Yes	?	X	MCFCWCD		1	X		X	X	X	X	X										X												X					
3-RYC-1	N/A	11	Ryan Creek	~150 ft upstream of Camino Alto and under road	~150 ft upstream of Camino Alto and under road		X	Non-tidal	Earthen	Modified	Yes	Yes	?	X	MCFCWCD		1-2										X	X									X																
3-SUT-1	N/A	11	Sutton Manor	Roque Moraes Dr just S of E. Blithedale Ave	btwn bike path & Roque Moraes - Bothin Marsh		X	Tidal	Earthen	Modified	Yes	Yes	Yes	X	City of Mill Valley		1-2																	X												X	X				
3-SUT-2	N/A	11	Sutton Manor	Roque Moraes Dr to Ashford Ave	Roque Moraes to Ashford		X	Tidal	Earthen	Modified	Yes	Yes	Yes		City of Mill Valley		1	X	X	X	X	X	X	X										X																
3-SUT-3	N/A	11	Sutton Manor	Ashford Ave to Dorset Ln	Ashford to Dorset (more or less)		X	Tidal	Concrete	Modified	Yes	Yes	Yes		City of Mill Valley		1-2	X	X	X	X	X	X	X											X																
3-SUT-4	N/A	11	Sutton Manor	Dorset Ln to Shell Rd ditch	Above Dorset		X	Non-tidal	Concrete	Modified	Yes	Yes	No		City of Mill Valley		1	X	X	X	X	X	X	X											X																
3-SUT-5	N/A	11	Sutton Manor	Shell Rd ditch parallel to Shell Rd	Shell Rd Ditch		X	Non-tidal	Earthen/Concrete	Modified	Yes	Yes	No		City of Mill Valley		1	X	X	X	X	X	X												X																
FLOOD CONTROL ZONE 4 - BEL AIRE AND STRAWBERRY CIRCLE																																																
4-EAST-1	Zone 4	10	East Creek	From Tiburon Blvd US to tidal extent (approx 350 ft)		X		Tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD	X	1	X	X	X	X	X	X	X			X						X												X	X				
4-EAST-2	Zone 4	10	East Creek	DS of Cecilia Way; ditch from Cecilia Way upstream to end of Karen Wa	East Creek downstream of Cecilia Way.	X	X	Non-tidal	Earthen	Modified	Yes	Yes			MCFCWCD		1	X	X	X	X	X	X	X	X								X		X																
4-WEST-1	Zone 4	10	West Creek	From Tiburon Blvd US to tidal extent (approx 425 ft)	Sediment removal at Pamela Ct.	X	X	Tidal	Earthen	Modified	Yes	Yes	Yes		MCFCWCD, STRAW	X	1	X	X	X	X	X	X	X			X	X						X																	
4-WEST-2	Zone 4	10	West Creek	From tidal extent US to Via Los Altos and a 100 ft section US of Reedlands Woods Way	Sediment removal at Cecilia Way	X	X	Non-tidal	Earthen	Modified	Yes	Yes	No		MCFCWCD, STRAW		1-2	X	X	X	X	X	X	X										X																
FLOOD CONTROL ZONE 5 - STINSON BEACH																																																
5-EAS-1	Zone 5	13	Easkoot Creek	Calle del Ribera to Calle de Pinos	Mouth to Calle del Pinos	X		Tidal	Earthen	Modified	Yes	No	Yes	X	MCFCWCD		1-2	X	X	X	X	X	X	X										X					X	X	X	X								
5-EAS-2	N/A	13	Easkoot Creek	Sediment trap on NPS land			X	Non-tidal	Earthen	Modified	Yes	No	Yes	X	MCFCWCD		1-2																	X					X	X	X	X								
5-EAS-3	Zone 5	13	Easkoot Creek	250 ft DS of Arenal Ave to 200 ft US of Hwy 1	Calle del Pinos to 200 upstream of HWY 1 (Arenal Bridge)	X	X	Non-tidal	Earthen	Modified	Yes	No	Yes	X	MCFCWCD		1-2	X	X	X	X	X	X	X										X					X	X	X	X								
FLOOD CONTROL ZONE 7 - SANTA VENETIA																																																
7-GAL	N/A	6	Gallinas Creek South Fork	South Fork; Behind Vendola Dr from Meadow Way to Pump Station 5	levees; redwood planter box repair only			Tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD	X	2-3							X	X		X			X	X	X																X	X	X			
7-PS-2	Zone 7	6	Gallinas Creek South Fork	Pump Station #4 detention basin		X	X	Non-tidal	Earthen	Modified	Yes	Yes	No		MCFCWCD	X	1								X		X	X			X		X																	
7-SOD	N/A	6	Gallinas Creek South Fork	Sunny Oaks Drain; NW of E. Vendola Dr intersection with N. San Pedro Rd	Fuels reduction on private property		X	Non-tidal	Earthen	Modified	Yes	Yes	No		MCFCWCD	X	1								X					X																				
FLOOD CONTROL ZONE 9 - ROSS VALLEY																																																

Site ID	Vegetation Project Area (CDFW)	Map # 2021	Creek	Location Description	Site Location Notes	Vegetation Maintenance	Sediment removal	Tidal Character	Substrate	Channel Type	RWQCB WDR/401	DFW 1600 RMA	USACE Permit Needed	Special Status Species	Partner	Fire fuel reduction on top of bank	Duration of Work	Limb and trim top of bank and side slopes of channel	Remove vegetation within channel bottom	Clear trash and debris from creek	Remove fallen trees	Hazard tree removal	Remove invasive non-native plants	Revegetation with native plant species	Cattail cutting	Erosion Control	Pump Station	Tide gate	Trash Rack	Levee Maintenance	California annual grass-land	Northern coastal salt marsh	Diked Bay-lands	North coast riparian scrub/ forest	Mixed evergreen forest	Pt. Reyes bird's beak	Hayfield tarweed	Marsh micro-seris	Marin knot-weed	White-rayed pentach aeta	Coho	Steel head	Monarch butterfly	CA red-legged frog	North west-ern pond turtle	CA Ridg way's rail	CA black rail	Salt marsh harvest mouse	Bat ssp	Northern spotted owl
9-CCT	N/A	8	Corte Madera Creek	10-14 College Ave			X	Tidal	Earthen	Modified	Yes	Yes	Yes		City of Larkspur		1-2																X																			
9-CMC-SR	N/A	n/a	Corte Madera Creek	Mouth to stilling basin; USACE project							NO	NO	N/A																																							
9-CMC-2	Lower Corte Madera Creek Complex	8	Corte Madera Creek	Corte Madera Creek concrete channel outfall US to tidal limit;	Corte Madera Creek concrete channel outfallUS to tidal limit (at Kentfield Rehab Hospital)	X		Tidal	Concrete	Engineered	Yes	Yes (Veg Only)	Yes	X	MCFCWCD		2	X		X	X	X	X					X						X										X									
9-CMC-3A	Lower Corte Madera Creek Complex	8	Corte Madera Creek	Concrete channel from tidal extent at Kentfield Rehab US to end of concrete channel	From tidal limit (at Kentfield Rehab Hospital) US to end of concrete channel	X	X	Non-tidal	Earthen	Engineered	Yes	Yes	Yes	X	MCFCWCD		2	X		X	X	X	X	X		X		X						X										X									
9-CMC-3B	Lower Corte Madera Creek Complex	8	Corte Madera Creek	Natural channel from end of concrete channel US to Lagunitas Rd Bridge	From end of concrete channel US to Lagunitas Bridge		X	Non-tidal	Earthen	Engineered	Yes	Yes	Yes	X	MCFCWCD		2									X									X										X									
9-FAIR	Fairfax Creek	7	Fairfax Creek	Fairfax Creek from Baywood Canyon Road bridge downstream to Shadow Creek of Fairfax HOA		X		Non-tidal	Earthen	Modified	Yes	Yes	N/A	X	Town of Fairfax		2-3	X	X	X	X	X	X	X	X												X									X		X						X
9-LAR-2	N/A	9	Larkspur Creek	Above tidal extent to end of Madrone Ave			X	Non-tidal	Earthen	Modified	Yes	Yes	No	X	MCFCWCD, City of Larkspur		3-4																					X				X					X								X
9-MAG-1	N/A	9	Corte Madera Creek	1100 Magnolia Ave			X	Tidal	Earthen	Modified	Yes	Yes	Yes		City of Larkspur		1-2									X									X														X	X	X		
9-MAG-2	N/A	9	Corte Madera Creek	1028 Magnolia Ave			X	Tidal	Earthen	Modified	Yes	Yes	Yes		City of Larkspur		1-2									X									X														X	X	X		
9-MAG-3	N/A	9	Corte Madera Creek	965 Magnolia Ave			X	Tidal	Earthen	Modified	Yes	Yes	Yes		City of Larkspur		1-2									X									X														X	X	X		
9-MAG-4	N/A	9	ditch flows into Corte Madera Creek	600 Magnolia Ave.			X	Non-tidal	Earthen	Modified	Yes	Yes	No		City of Larkspur		1-2																																				
9-MUR	Lower Corte Madera Creek Complex	8	Murphy Creek	From the Murphy Creek culvert at Kent Ave US to border of the Town of Ross, including culverts and crossings	Vegetation maintenance includes community efforts US of College of Marin	X	X	Tidal 30ft US only	Earthen	Modified	Yes	Yes	Yes		MCFCWCD, DPW		2-3	X	X	X	X	X	X	X												X																X		
9-SHC-2	Upper Corte Madera Creek Complex	7	Sleepy Hollow Creek	From San Anselmo town limit to confluence with Van Winkle Cr		X		Non-tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD		2-3	X	X	X	X	X	X	X												X										X								
9-SHC-3	N/A	7	Sleepy Hollow Creek trib	300 Hidden Valley Ln culvert			X	Non-tidal	Earthen	Modified	Yes	Yes	No		MC Roads		1-2																					X																
9-SHC-4	N/A	7	Sleepy Hollow Creek	960 Butterfield Rd/Green Valley Ct			X	Non-tidal	Earthen	Modified	Yes	Yes	No	X	MC Roads		1-2																					X										X						
9-SHC-5	N/A	7	Sleepy Hollow Creek	Butterfield Rd/Sleepy Hollow Dr bridge			X	Non-tidal	Earthen	Modified	Yes	Yes	No	X	MC Roads		1-2																					X										X						
9-SHC-6	N/A	7	Sleepy Hollow Creek	Katrina Ln			X	Non-tidal	Earthen	Modified	Yes	Yes	No	X	MC Roads		2-3																					X																
9-SHC-7	N/A	7	Sleepy Hollow Creek	Van Winkle Dr culvert			X	Non-tidal	Earthen	Modified	Yes	Yes	No		MC Roads		1-2																					X																
9-VAN-1	Upper Corte Madera Creek Complex	7	Van Winkle Creek	Sleepy Hollow Cr to 275 Van Winkle		X		Non-tidal	Earthen	Modified	Yes	Yes	N/A		MCFCWCD		2	X	X	X	X	X	X	X												X																		
9-VAN-2	N/A	7	Van Winkle Creek	Ichabod Ct culvert			X	Non-tidal	Earthen	Modified	Yes	Yes	No		MC Roads		1-2																					X																
9-VAN-3	N/A	7	Van Winkle Creek	Tappan Rd culvert			X	Non-tidal	Earthen	Modified	Yes	Yes	No		MC Roads		1-2																					X																
9-VAN-4	N/A	7	Van Winkle Creek	Mather Rd culvert			X	Non-tidal	Earthen	Modified	Yes	Yes	No		MC Roads		1-2																					X																
9-VAN-5	N/A	7	ditches to Van Winkle Creek	155 and 201 Van Winkle Drive	2 sediment removal sites in ditch (155 and 201 Van Winkle Dr)		X	Non-tidal	Earthen	Modified	Yes	Yes	No		MC Roads		1-2																					X																
9-VAN-6	N/A	7	Van Winkle Creek	Manitou Dr culvert			X	Non-tidal	Earthen	Modified	Yes	Yes	No		MC Roads		2-3																					X																
9-WARD	N/A	9	Larkspur Creek	Outfall from city parking lot at 500 Magnolia, across from 25 Ward St			X	Non-tidal	Earthen	Modified	Yes	Yes	Yes		City of Larkspur		1-2																				X																
9-WILL	N/A	9	roadside ditch into marsh	444 block of William Ave.			X	Partially tidal	Earthen	Modified	Yes	Yes	No		City of Larkspur		1																																				
COUNTY SERVICE AREA 13 - UPPER LUCAS VALLEY																																																			
CSA-13-MC	CSA 13	5	Miller Creek	From Mt McKinley Rd to Mt Lassen Dr (including Lucas Valley Elementary School), and at Miller Creek Middle School (outside of CSA 13)	Miller Creek, including STRAW project sites	X		Non-tidal	Earthen	Modified	Yes	Yes	N/A	X	MCFCWCD; STRAW		5-6	X		X	X		X	X												X					X						X						X		

APPENDIX A.1

SMP VEGETATION MAINTENANCE PROJECTS

SMP Vegetation Maintenance				
Zone	**Project Area (CDFW)**	**Creek**	**Site (Old Project Area)**	**Justification for Combining Sites**
1	Novato Baylands	Novato Creek	1-NOV-1;	N/A
1	Upper Novato Creek Area	Novato Creek-2 (100 LF)*; Novato Creek-3 (123 LF); San Marin Creek (20 LF); San Ramon Creek (20 LF);	1-NOV-2; 1-NOV-3; 1-SRC; 1-SMC;	Riparian Area and connected (we just don't have jurisdiction over whole creek)
1	Novato Creek Tributaries	Vineyard Creek (175 LF); Wilson Creek (32 LF); Warner Creek (328 LF);	1-VIN; 1-WIL; 1-WAR-2; 1-WAR-1;	Riparian Area and connected (we just don't have jurisdiction over whole creek)
1	Rush Creek	Rush Creek (55 LF)	1-RUSH	Riparian Area and connected (we just don't have jurisdiction over whole creek);
1	Arroyo Avichi	Arroyo Avichi (78 LF)	1-AA-2; 1-AA-1	Riparian Area but we don't have jurisdiction over whole area; similar species (i.e. no special status species (SSS))
1	Baccaglio Basin	Baccaglio Basin (3 LF)	1-BB-1; 1-BB-2	Similar species in area (i.e. no SSS)
1	Lynwood Creek	Lynwood Creek (145 LF)	1-LYC	N/A
1	Cheda Creek Upland	Cheda Creek (18 LF)	1-CHE-2	N/A
1	Pacheco Creek Upland Complex	Pacheco Creek (42 LF)	1-PAC-2; 1-PAC-3	Riparian Area and connected (we just don't have jurisdiction over whole creek); similar species (i.e. no SSS)
1	Arroyo de San Jose Lower Complex	Pacheco Creek (69 LF); Arroyo de San Jose Creek (144 LF)	1-PAC-1; 1-ASJ-1;	Similar habitat (riparian); similar speciees
1	Arroyo de San Jose Upper Complex	Ignacio Creek (90 LF); Arroyo de San Jose (221 LF)	1-IGN; 1-ASJ-2; 1-ASJ-3	Riparian area and connected (we just don't have jurisdiction over whole creek)
3	Zone 3	Coyote Creek	3-COY-2; 3-COY-3; 3-COY-5	No vegetation maintenance has occurred here in the last 2 years; similar habitat (riparian) and no SSS
4	Zone 4	East Creek (39 LF); West Creek (29 LF)	4-WEST-1; 4-WEST-2; 4-EAST-1; 4-EAST-2	Small amount of work in Zone; both creeks simillar in varying habitats and species; creeks near each other
5	Zone 5	Easkoot Creek (188 LF)	5-EAS-1; 5-EAS-2; 5-EAS-3	One creek and similar habitat and species

Zone	Project Area (CDFW)	Creek	Site (Old Project Area)	Justification for Combining Sites
7	Zone 7	N/A	7-PS-2;	N/A
9	Lower Corte Madera Creek Complex	Corte Madera Creek; Murphy Creek	9-CMC-2; 9-CMC-3; 9-MUR;	No vegetation maintenance has occurred here in the last 2 years; one creek (Corte Madera Creek) and one tributary (Murphy Creek) that eventually flows into Corte Madera Creek; similar habitat
9	Upper Corte Madera Creek Complex	Sleepy Hollow Creek; Van Winkle Creek;	9-SHC-2; 9-VAN-1;	Similar habitat (riparian); connected as one creek or tributaries to Corte Madera Creek; besides Fairfax Creek, no vegetation maintenance has occurred here in the last 2 years
9	Fairfax Creek	Fairfax Creek (18 LF)	9-FAIR	N/A
CSA 13	CSA 13	Miller Creek (192.5 LF)	CSA-13-MC	N/A

* = 2 year average of actual work

APPENDIX B

SEDIMENT REMOVAL SITES

Marin County Flood Control-Stream Maintenance Program

Sediment Removal Sites

6/11/2021

Site Description														Project Dimensions (LxWxH)						Work Days		Project Description		Equipment Location During Sediment Removal							Heavy Equipment Access and Staging			Temporary Stockpiling Locations				Original Geomorphic Codes (2016)								
Zone	Site #	Watershed	Site Name in SMP	Location Description	Included in RWQCB ORDER	Included in DFW RMA	ACOE Permit Needed	BCDC Permit Needed	Municipal Jurisdiction	Channel Type	Tidal (Yes/No)	Coffer Dam / Diversion (Yes/No)	Stream Class code	Habitat Type	Vegetation / Habitat Types	Length of Segments (Feet)	Total LF	Depth (Feet)	Width (Feet)	Area FT²	Pipe Diameter (Inches)	Min	Max	Work Description & Methods of Operation	Frequency of Removal	Equipment Used	Top of Creek Bank	Adjacent Roadway or Pull-out	In-channel	Boat or pier	Top of levee	Hand Method	From roadway, parking lot, or pull-outs - no veg to remove	Across off-road area - no veg to remove	In channel and/or requires veg trimming/removal to get in	On roadway, parking lot, or pull-outs - no veg to remove	On off-road area - no veg to remove	Chronic Sediment Notes	Sediment Issue Chronic?	Sediment Severity	1 Urban/Wildland interface	2 Tidal backwater	3 Engineered silt basin	4 Road crossing width	5 Reduction channel gradient	6 Widened channel cross section	7 Debris or vegetation obstruction	8 Sediment aggradation at outlet	9 Bar grading/low flow channel maintenance	A Site is located within an alluvial depositional zone (sudden reduction in channel gradient). Human activity (watershed development, channel confinement, etc.) has caused the site to shift from a transport zone to a depositional zone.
ZONE 1																																													
1	1-AA-1	Arroyo Avichi - Novato	Arroyo Avichi	Novato Creek to culvert at Novato Blvd	Yes		No			Earthen Engineered Flood Control	No	No						2	10	1500																												
1	1-AA-2	Arroyo Avichi - Novato	Arroyo Avichi	Arroyo Avichi; end of Taft Ct.	Yes	Yes	No			Natural	No	No	1	north coast riparian	Dry stream bed gravel	40 - 45	42	4	15	600	N/A	3	5	Remove 140 CY of sediment from 40-45 ft of channel. Work performed with equipment on roadway and in the channel.	Every 3 to 5 years	Long-reach Excavator, Loader, Hauler	X	X	X					X				Upper watershed erosion on lands not owned by FC; possible bank stabilization issues; not frequent; 2015	stabilization US might	Low				x				x			
1	1-ASJ-2	Arroyo San Jose-Novato	Arroyo San Jose	Arroyo San Jose crossing at Ignacio Blvd bridge	Yes	Yes	Yes			Concrete Engineered Flood Control	No	No	2	north coast riparian	Stream bed gravel with cattails	90	90	4	15	1350	N/A	3	5	Remove approximately 885 CY of sediment and cattails from 90 ft of channel and silt basin just US of Ignacio Blvd crossing. Equipment will be located on roadway or	Every 5 to 6 years	Clam Shell Bucket Crane, BobCat, Hauler	X	X	X					X	X	X			Upper watershed erosion on lands not owned by FC	Yes	Low			x	x						
1	1-BB-1	Arroyo Avichi - Novato	Arroyo Avichi - Bypass to Baccaglio Basin	Arroyo Avichi bypass to Baccaglio Basin	Yes	Yes	No			Natural	No	No	1	diked baylands	Stream bed gravel only	30	30	4	10	300	N/A	1	2	Remove accumulated sediment from bypass channel	Every 3 to 5 years	Long-reach Excavator, Hauler	X							X	X				High flow channel; trash rack sometimes diverts water thru; maybe NWP can identify changes. Sediment removal at this site should be monitored after the	NWP may propose alternative	Low				x							
1	Site Removed from Sediment List 2021 1-LY5	Novato Creek - Lynwood Slough	Lynwood Slough	Lynwood Basin at Lynwood Pump Station; 70 LF, 4 ft. deep, 70 ft. wide	Yes	Yes	No				No	No				70	70	4	70	1400	1	1	3	Remove sediment from 70 ft of channel from pump station into pond. Equipment stayed on top of levee.	Every 4 years	Long-reach Excavator, Hauler									X									x							
1	1-NWD-1	Upper Novato	North Marin Water District	Novato Creek at Grassi Ranch DS of Stafford Lake	Yes	Yes	No			Natural	No	No	1	north coast riparian	Dry streambed; no vegetation	400	400	2	15	6000	N/A	2	3	Remove sediment from sediment trap on Novato Creek US of Stafford Lake	Every 1 - 3 years	Long-reach Excavator,			X											Yes	Medium; fills in	x				x							
1	1-NWD-2	Upper Novato	North Marin Water District	NMWD lands near Indian Valley Golf Course	Yes	Yes	No			Natural	No	No	1	north coast riparian	Dry streambed; no vegetation	75	75	1	14	1050	N/A	1	2	Remove sediment from sediment trap on tributary US of Stafford Lake	Every 1 - 3 years	Long-reach Excavator,			X											Yes	Medium; fills in	x				x							
1	1-RUSH	Rush Creek	Rush Creek at Golden Gate Pl	N of Olive Ave, end of Railroad Ave to Caltrans ROW	Yes	Yes	Yes	Yes	City of Novato	Earthen Engineered Flood Control	YES	NO	3	salt marsh	Tidal Riparian	Caltrans ROW 400	600	3	10	6000		3	5	US HWY 101 ROW and 280Ft DS Binford Rd including (2) Culverts Outfall	3 - 5 years	Long Reach Excavator, Hauler			X	X			X				X		with Caltrans. Removing sediment at the Flood Control Easement would not be effective unless there is a		fills in after	x	x				x	x						
	Site Removed from Sediment List 2021 1-RUSH-2	Rush Creek	CalTrans ROW US of Binford	Rush Creek CalTrans ROW	Yes	Yes	Yes		City of Novato and CalTrans	Earthen Engineered Flood Control																																						
	Site Removed from Sediment List 2021 1-RUSH-3	Rush Creek	ditch into CalTrans ROW	Rush Creek CalTrans ditch along 101	Yes	Yes	Yes		City of Novato and CalTrans	Earthen Engineered Flood Control																																						
1	Site Removed from Sediment List 2021 1-SIMM	Simmons Slough	Simmons Slough	Simmons Slough at Pump Station	No	Yes	Yes			Earthen Engineered Flood Control	No	No	3	north coast riparian	north coast riparian	2880; 2000	4800	4	25	750	N/A	5	7	Remove sediment to promote positive flow to Pump intake from DS HWY 37 to Novato Creek Levee and perpendicular levee Screw Gate to January Outlet PS.	Every 1 - 3 years	Long-reach Excavator, Hauler					X				X				Very low gradient; water at intake is normal; aggradation occurs US of pump intake and blocks intake water to pump station	Yes	Low				x				x			
1	1-VIN	Vineyard Ck - Novato	Vineyard Creek	Vineyard Creek at Center Road bridge	Yes	Yes	No			Earthen Engineered Flood Control	No	No	2	north coast riparian	Streambed; no vegetation	75	75	5	5-25	2250	N/A	1	2	Remove accumulated sediment from DS of bridge using excavator or a	Every 1 - 3 years	Long-reach Excavator, Hauler			X			X	X						Trees 300 ft US causing scour; sediments deposit at bridge	removes US trees,	High				x	x		x				
ZONE 3																																												
3	3-BM	Bothin Marsh	Unnamed Creek - Richardson Bay	Bothin Marsh; Bithedale Ave. at Roque Morales Dr.	Yes	Yes	Yes	Yes		Natural	Yes	Yes	1	salt marsh	pickleweed, cordgrass, SF	175	175	3	20 - 30	4375	N/A	1	2	below outfall. Average depth of excavation is 3 feet. A long Project Area excavator or a	Every 3 years	Long-reach Excavator, Hauler	X	X					X	X		X	X		Since removing sediment at the Flood Control Easement would not be effective.	Yes	Low	x											
3	3-COY-2	Coyote Creek	Coyote Creek	Coyote Creek DS of Laurel Way, to DS of Ross Dr.	Yes	Yes	Yes			Concrete Engineered Flood Control	Yes	Yes	3	north coast riparian	Concrete bottom no emergent vegetation present	1325	1,325	6	16	21200	N/A	2	4	of concrete channel. Lower equipment (e.g., small loader) into channel to push material to DS end where an excavator will be placed	Every 3 years	Long-reach Excavator, Loader, Hauler			X	X		X	X	X	X	X	X		20 year CL model shows it overtops at <20; ACOE requires FC to maintain 1ft. Freeboard on design event (200L) goal is to remove US sediments in concrete	Yes	Low	x					x						
3	3-COY-3	Coyote Creek	Coyote Creek	Coyote Creek from US of Ash St.to Laurel Way.	Yes	Yes	Yes			Concrete Engineered Flood Control	No	Yes	3	north coast riparian	Concrete bottom no emergent vegetation present	1365	1,365	6	16	21840	N/A	2	4	of concrete channel. Lower equipment (e.g., small loader) into channel to push material to DS end where an excavator will be placed	Every 3 years	Long-reach Excavator, Loader, Hauler			X	X		X	X	X	X	X	X		20 year CL model shows it overtops at <20; ACOE requires FC to maintain 1ft. Freeboard on design event (200L) goal is to remove US sediments in concrete	Yes	Low						x						
3	Site Removed from Sediment List 2021 3-COY-4	Coyote Creek	Coyote Creek	Coyote Creek between Pineo Ave. and Northern Ave., approx. 225 ft west of intersection with Maple St.	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	north coast riparian	Open water - no vegetation	20 N/A	20	4 N/A	5 - 10 N/A	140	N/A 60 RCP w/HW	1	1	section of earthen channel immediately US of storm drain pipe inlet leading to Coyote Creek open concrete channel. Work performed by hand methods.	Annually	Hand Removal, Hauler			X	X									Upper watershed erosion on lands not owned by FC	Yes	Low	x						x					
3	Site Removed from Sediment List 2021 3-COY-5	Coyote Creek	Coyote Creek	behind 503 Pineo Ave (between Pineo Ave. and Marin Ave.; approximately 135 ft west of Maple St.)	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	north coast riparian	Open water with cattails	450	450	5 - 8	3 - 6	1800	N/A	1	1	section of earthen channel immediately US of storm drain pipe inlet (84" RCP with headwall) leading to Coyote Creek open concrete channel. Work performed by hand	Annually	Long-reach Excavator, Hand Removal Hauler	X		X	X				X					Upper watershed erosion on lands not owned by FC	Yes	Low	x						x					
3	3-CRE-1	Crest Marin Creek	Crest Marin Creek	Crest Marin Creek DS of Ross Dr footbridge at Marin Ave	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	grassland	cattails, watercress & duckweed	300	300	5 - 10	3 - 10	1800	N/A	1	1	section of earthen channel by hand methods to convenient locations and then removed	Every 3 years	Excavator, Hand Removal Hauler			X				X	X					Very low gradient reach	Yes	Low					x		x					
3	3-CRE-2	Crest Marin Creek	Crest Marin Creek	Crest Marin Creek at end of Laurel Way in Tamalpais Valley.	Yes	Yes	No			Concrete Engineered Flood Control	No	No	3	north coast riparian	Open water - no vegetation	10 - 15	25	4	20 - 25	300	N/A	1	2	Remove accumulated sediment at sediment basin. Work performed from top of bank using excavation equipment.	Annually	Long-reach Excavator, Hauler			X				X						Upper watershed erosion; sediments captured at basin before entering concrete channel.	Yes	Medium	x		x									
3	3-MIL-1	Richardson Bay	Miller Ave. (north outfalls - 2 sediment sites)	Miller Ave drainage; immediately south of intersection of Miller Ave and Camino Alto.	Yes	Yes	Yes	Yes		Concrete Engineered Flood Control	Yes	No	3	salt marsh	open water; tidal regime with cordgrass at pipe outfall	90; 300; 30	420	4-8	6	2880	N/A 8 N/A	2	3	running south from intersection of Camino Alto with Miller Ave. 2) double box culverts under Miller Ave. 3) from DS earthen outfall at the slough that is tributary to the tidal	Every 3 years	Long-reach Excavator, Loader, Hauler, Vactor			X		X	X							Sediment from tidal action	Yes	Medium		x										
3	3-MIL-2	Richardson Bay	Miller Ave. (south outfalls)	Miller Ave across from Tamalpais High School; just south of Miller Ave - North Ave. sediment removal site.	Yes	Yes	Yes	Yes		Earthen Engineered Flood Control	Yes	No	3	salt marsh	Cordgrass at pipe outfall	30	30	4 - 6	10 - 15	360	N/A	1	1	Remove accumulated sediment from 30 feet of channel DS of one outfall.	Every 3 years	Long-reach Excavator, Loader, Hauler			X			X				X			Sediment from tidal action	Yes	Low		x										
3	3-MIL-3	Richardson Bay	Almonte Bothin Marsh	Miller Ave. drainage; across from Tamalpais High School track between Miller ave. and open	Yes	Yes	Yes	Yes		Earthen Engineered Flood Control	Yes	No	3	salt marsh	Native Cordgrass	750 20	793	3 - 5 N/A	4 - 8 N/A	4500	N/A 18 HDPE	2	3	Excavate vegetation and silt from up to 750 ft of tidal channel and two culverts between and parallel to Miller Ave. and a multi-use	Every 3 years	Long-reach Excavator, Hauler	X		X					X	X	X	X		Sediment from tidal action	Yes	Low		x										
3	3-NYN-1	Richardson Bay	Nyhan Creek - Coyote Creek - Richardson Bay	Nyhan Creek near the intersection of Enterprise Concourse with Tennessee Valley.	Yes	Yes	No	Yes		Earthen Engineered Flood Control	Yes	No	2	north coast riparian	Dry stream bed - no vegetation		140		10	1400	N/A	1	2	Remove sediment from an approximately 140 ft section of creek approximately 100 feet DS and 40 feet US of Enterprise	Annually	Long-reach Excavator, Hauler	X	X					X	X	X	X			Sediment from tidal action and from upper watershed settling in low gradient reach	Yes	Low					x	x						
3	3-NYN-2	Richardson Bay	Nyhan Creek West Fork	Nyhan Creek behind Tamalpais Valley Elementary School.	Yes	Yes	No			Concrete Engineered Flood Control	No	No	3	north coast riparian	concrete channel - open water	400 - 500	450	2	4 - 5	2025	N/A	1	1	section of concrete lined channel. The material will be moved by hand methods to	Every 3 years	Excavator, Loader, Hauler			X				X			X			Low gradient artificial channel at bottom of hill	Yes	Low					x							
3	3-REED-1	Richardson Bay	Reed Creek - ACMP - Richardson Bay	Reed Creek; DS of Miller Ave.	Yes	Yes	Yes	Yes		Earthen Engineered Flood Control	Yes	Most likely	3	salt marsh	Open water - no vegetation	160	160	5	5 - 10	1120		2	3	approximately 160 linear feet of earthen channels DS of Miller Ave. Work performed	Every 3 years	Excavator, Hauler, Vactor	X		X					X	X		X	X	Sediment from upper watershed settling in low gradient reach	Yes	Medium					x		x					
3	3-RYC-1	Richardson Bay	Ryan Creek -Richardson Bay	Ryan Creek; west side of Camino Alto, north of intersection with Sycamore Ave.	Yes	Yes	No			Earthen Engineered Flood Control	Yes	No	3	diked baylands	primarily cordgrass. Tidal influence is controlled by tide	100 250	350	3 - 4	6 - 8	2450	48	1	2	at a DS pump station is closed, thereby eliminating tidal influence. Sediment accumulations (typically 1-2 ft) will be	Every 3 years	Long-reach Excavator, Loader, Hauler	X		X					X			X		low gradient reach just above tidal influence	Yes	Low		x			x							
3	3-SUT-1	Richardson Bay	Sutton Manor Creek	Sutton Manor at Roque Morales Dr., immediately south of the intersection with Bithedale Ave.	Yes	Yes	Yes	Yes		Earthen Engineered Flood Control	Yes	Yes	3	salt marsh	Tidal habitat = pickleweed, cordgrass, SF	100	170	270	4 - 6	20	3210	48 N/A	1	2	Remove accumulated sediment from bottom of Roque Morales Dr. crossing 2) culvert under Roque Mores Dr. and 3) excavate	Every 3 years	Long-reach Excavator, Loader, Hauler, Vactor	X	X						X	X		X	X	Sediment from tidal action	Yes	Low		x										
3	3-SUT-2	Richardson Bay	Sutton Manor Creek	Sutton Manor from Roque Morales US to Ashford Ave.	Yes	Yes	Yes			Earthen Engineered Flood Control	Yes	Yes	3	salt marsh	Tidal habitat = pickleweed, cordgrass, SF	600	600	5 - 6	10	6000	N/A	2	3	channel (DS of Ashford Ave. crossing) for a length of 600 feet using equipment placed	Every 3 years	Excavator, Loader, Hauler	X	X	X	X	X			X	X	X	X	X	Sediment from tidal action	Yes	Low		x										
3	3-SUT-3	Richardson Bay	Sutton Manor Creek	Sutton Manor from Ashford Ave, US to Dorset Ln.	Yes	Yes	Yes			Earthen Engineered Flood Control	Yes	Yes	3	grassland	pickleweed, cordgrass, SF	100	225	325	5 - 6	10	2250	48 N/A	2	3	earthen channel US of Ashford Ave. crossing and culvert under E. Bithedale Ave. Small	Every 3 years	Excavator, Loader, Hauler	X	X	X					X	X	X	X	X	Low gradient artificial channel network	Yes	Low		x										
3	3-SUT-4	Richardson Bay	Sutton Manor Creek	Sutton Manor from Dorset Ln. US to Shell Rd ditch.	Yes	Yes	No			Concrete Engineered Flood Control	No	Yes	3	grassland	Dry streambed; no vegetation	375	375	4 - 5	4.5 - 15	3750	N/A	2	3	concrete channel up to the Shell Rd ditch. Small loaders will be placed in the concrete	Every 3 years	Excavator, Loader, Hauler	X	X	X					X	X	X	X	X	Low gradient artificial channel network	Yes	Low					x							
3	3-SUT-5	Richardson Bay	Sutton Manor Creek	Sutton Manor Creek - Shell Rd ditch; below and parallel to Shell Rd.	Yes	Yes	No			Concrete Engineered Flood Control	No	Yes	3	grassland	Dry stream bed with limited cattails	1600	1,600	4 - 5	4.5 - 15	16000	N/A	2	3	Clean approximately 1,600 linear feet of concrete channel parallel to Shell Rd.	Every 3 years	Long-reach Excavator,	X	X	X					X	X	X	X	X	Low gradient artificial channel network	Yes	Low					x		x					
Zone 4																																												
4	4-EAST-2	Bay	East Creek	East Creek DS of Cecilia Way; ditch from Cecilia Way US to	Yes	Yes	Yes			Earthen Engineered Flood Control	No	No	3	Non Natives and north coast	Cattails	750	750	3	2-9	3750	N/A	1	2	Remove accumulated sediment from DS side of Cecilia Way crossing within road ROW.	Every 3 years	Long-reach Excavator, Hauler	X	X						X	X	X			Sediment deposits at inlet; cattails (not owned by FC); network of privately made ditches with varying	Yes	Low					x							
4	Site Removed from Sediment List 2021 4-STR	Strawberry Ditch-Richardson Bay	Strawberry Circle Ditch and levee	Strawberry Circle ditch by Strawberry Pump Station;	Yes	NO	No				No	No	3	6060	Non-tidal, open water	300		2-3	2-8	1500	N/A	1	2	of channel near Strawberry Circle Pump Station. Excavator will be staged from the top of the levee. Work will be performed at	Every 5 years	Long-reach Excavator, Hauler		X				X			X																				
4	4-WEST-1	Bay	West Creek	Pump Station	Yes	Yes	Yes			Control	Yes	No	3	tidal to non	Cordgrass	100	100	6	5 - 8	650	N/A	1	2	of channel US of Pamela Court Pump Station.	Every 3 years	Excavator		X				X			X				Sediment from tidal action).	Yes	Low		x			x				x			
4	4-WEST-2	Bay	West Creek	West Creek DS of Cecilia Way.	Yes	Yes	NO			Control	No	No	3	Non Natives	emergent veg	10	10	4	6	60	N/A	1	1	side of Cecilia Way crossing within road.	Every 3 years	End Loader,		X				X								Yes	Medium					x							
Zone 5																																												
5	Site Removed from Sediment List 2021 5-EAS-1a	Easkoot Creek	Easkoot Creek	Easkoot Creek; Calle del Arroyo intersection with Shoreline Highway.	Yes	NO	Yes			Earthen Engineered Flood Control	Yes	No			Tidal - streambed gravel	40	50	2 - 3	10	400	N/A	1	1	Remove accumulated sediment between 25 ft US and 25 ft DS of bridge crossing. Work performed from top of bank using excavation equipment.	Annually if needed	Long-reach Excavator, Hauler	X	X	X				X						Upper watershed erosion on lands not owned by FC; sediment deposited in low gradient DS reach of Easkoot Creek	sediment removal at sediment trap on	Medium				x		x						
5	Site Removed from Sediment List 2021 5-EAS-1b	Easkoot Creek	Easkoot Creek	Easkoot Creek; Calle del Onda intersection with Shoreline Highway.	Yes	NO	Yes			Earthen Engineered Flood Control	Yes	No			Tidal - streambed gravel	40	50	2 - 3	10	400	N/A	1	1	Remove accumulated sediment between 25 ft US and 25 ft DS of bridge crossing. Work performed from top of bank using excavation equipment.	Annually if needed	Long-reach Excavator, Hauler	X	X	X				X						Upper watershed erosion on lands not owned by FC; sediment deposited in low gradient DS reach of Easkoot Creek	sediment removal at sediment trap on	Medium				x		x						
5	Site Removed from Sediment List 2021 5-EAS-1c	Easkoot Creek	Easkoot Creek	Easkoot Creek; Calle del Sierra intersection with Shoreline Highway.	Yes	NO	Yes			Earthen Engineered Flood Control	Yes	No			Tidal - streambed gravel	40	50	2 - 4	10	400	N/A	1	1	Remove accumulated sediment between 25 ft US and 25 ft DS of bridge crossing. Work performed from top of bank using excavation equipment.	Annually if needed	Long-reach Excavator, Hauler	X	X	X				X						Upper watershed erosion on lands not owned by FC; sediment deposited in low gradient DS reach of Easkoot Creek	sediment removal at sediment trap on	Medium				x		x						
5	Site Removed from Sediment List 2021 5-EAS-1d	Easkoot Creek	Easkoot Creek	Easkoot Creek; Calle del Pradero intersection with Shoreline Highway.	Yes	NO	Yes			Earthen Engineered Flood Control	Yes	No			Tidal - streambed gravel	40	50	3	10	400	N/A	1	1	Remove accumulated sediment between 25 ft US and 25 ft DS of bridge crossing. Work performed from top of bank using excavation equipment.	Annually if needed	Long-reach Excavator, Hauler	X	X	X				X						Upper watershed erosion on lands not owned by FC; sediment deposited in low gradient DS reach of Easkoot Creek	sediment removal at sediment trap on	Medium				x		x						
5	Site Removed from Sediment List 2021 5-EAS-1e	Easkoot Creek	Easkoot Creek	Easkoot Creek; Calle del Pinos intersection with Shoreline Highway.	Yes	NO	Yes			Earthen Engineered Flood Control	Yes	No			Tidal - streambed gravel	40	50	3	10	400	N/A	1	1	Remove accumulated sediment between 25 ft US and 25 ft DS of bridge crossing. Work performed from top of bank using excavation equipment.	Annually if needed	Long-reach Excavator, Hauler	X	X	X				X						Upper watershed erosion on lands not owned by FC; sediment deposited in low gradient DS reach of Easkoot Creek	sediment removal at sediment trap on	Medium				x		x						
5	5-EAS-2	Easkoot Creek	Easkoot Creek	creek floodplain on NPS land adjacent to NPS parking lot behind the Parkside Café	Yes	NO	Yes			Earthen Engineered Flood Control	No				None - streambed gravel	150	150	3	10	1500	N/A	1	2	Remove accumulated sediment from engineered basin. Work from top of bank and access ramp using long range excavator.	Annually	Long-reach Excavator, Hauler	X	X						X						Yes	Medium				x		x						
5	5-EAS-3	Easkoot Creek	Easkoot Creek	Easkoot Creek; Arenal Rd. east of intersection with Marine Way.	Yes	NO	Yes			Earthen Un-Engineered Flood Control	No	No			None - streambed gravel	20	20	7	10	200	N/A	1	1	ft US and 150 ft DS of bridge crossing. Work performed from top of bank using	Annually if needed	Long-reach Excavator, Hauler	X	X						X						sediment deposited in low gradient DS reach of Easkoot Creek	sediment removal at	Medium				x		x						
Zone 7																																												
7	Site Removed from Sediment List 2021 7-CAS	Gallinas Creek - San Pablo Bay	Castro Ditch	Castro Ditch between Vendola Dr and Rafael Way.	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	grassland	Non-native annual grasses	1300	1300	2 - 4	4 - 10	9100	N/A	1	1	trapezoidal ditch using hand methods. Entire stretch is approximately 1300 ft long, but annual work will be spot areas along that	Annually	Hand Removal, Hauler			X	X									Local drainage and sediment deposition	Yes	Low				x		x						
7	Site Removed from Sediment List 2021 7-EST	Gallinas Creek - San Pablo Bay	Estancia Ditch	4 to Pump Station No. 5 (E. Vendola Dr. north of its intersection with Adrian Way to	Yes	Yes	Yes	Yes		Earthen Engineered Flood Control	No	No	3	diked baylands	grass and non-native annual grasses	2885	2885	2 - 10	2 - 8	14425	N/A	2	2	emergent vegetation from approximately 3,000 ft channel extending from Pump Station No. 4 to Pump Station No. 5.	Every 3 years	Long-reach Excavator, Hauler			X			X					X		Low gradient	2 ballot measures for	High				x							
7	Site Removed from Sediment List 2021 7-LAP-1	Gallinas Creek - San Pablo Bay	La Pasada Interceptor outfall	La Pasada Interceptor outlet; La Pasada Way intersection with Vendola Dr.	Yes	Yes	Yes			Earthen Engineered Flood Control	Yes	Yes	3	salt marsh	Cordgrass at outfall	270 15	285	N/A 5 - 15	15 15	4275	48 CMP N/A	5	10	Remove accumulated sediment from up to 270 ft section of pipe and accumulated sediment within 15 feet of outfall in Gallinas Creek. Pipe will be cleaned with Vactor	Every 3 years	Vactor			X	X		X	X	X	X	X	X		Sediment from tidal action	Yes	Medium		x					x					
7	Site Removed from Sediment List 2021 7-LAP-2	Gallinas Creek - San Pablo Bay	La Pasada Interceptor storm drain pipe and inlet	La Pasada Interceptor inlet; La Pasada Way intersection with N. San Pedro Rd.	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	grassland	Ditch with annual grass - no vegetation	1000 6 50	1056	6 1 - 2	6 2 - 4	6185	33 RCP N/A N/A	1	1	Remove accumulated sediment in series of roadside ditch inlets to La Pasada interceptor. Equipment will be placed on top of road or pull-out.	Annually	Long-reach Excavator, Hauler			X					X					Low gradient	Yes	Medium	x						x					
7	Site Removed from Sediment List 2021 7-MAB	Gallinas Creek - San Pablo Bay	Mabry Ditch	Mabry Ditch; between Mabry Way and Birch Way.	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	grassland	Non-native annual grasses	1600	1,600	2 - 4	1 - 5	4000	N/A	1	1	Remove sediment as needed from earthen ditch using hand methods. Entire stretch is 1600 ft long, but annual work will be spot areas along that length, with amounts	Annually	Hand Removal, Hauler			X	X									Local drainage and sediment deposition	Yes	Very low							x					
7	Site Removed from Sediment List 2021 7-MEA-1	Gallinas Creek - San Pablo Bay	Meadow Way Interceptor Pipe and Outlet	Meadow Way Box and outfall; Meadow Way from its end at Las Gallinas Creek southward towards N. San Pedro Rd.	Yes	Yes	Yes			Earthen Engineered Flood Control	Yes	Yes	3	salt marsh	Cordgrass at outfall	800 15	815	7 10	4 15	6520	7' x 4' RCB N/A	5	10	ft section of 7'x4' concrete box culvert (total culvert length is 1400 ft) and accumulated sediment within 15 feet of outfall in Gallinas Creek.	Every 3 years	Long-reach Excavator, Loader, Hauler	X	X	X	X		X	X	X	X	X	X		Sediment from tidal action and from US sources	Yes	Medium		x										
7	Site Removed from Sediment List 2021 7-MEA-2	Gallinas Creek - San Pablo Bay	Meadow Way Interceptor Inlets (2 inlets)	inlets with trash racks.1) North Inlet (Thompson) - 308 San Pedro Ct. 2) South Inlet (7-11) - 284 N. San Pedro Rd.	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	north coast riparian	Dry streambed - no vegetation	10 -15 20 - 30	35	9 11	7 8	350	48 RCP 54 RCP	1	1	Remove accumulated sediment from two inlets to Meadow Way Interceptor. Equipment will be placed on top of bank or driveway.	Annually	Long-reach Excavator, Hauler	X	X						X			X		Upper watershed erosion on lands not owned by FC	Yes	Medium	x				x							
7	7-PS-2	Richardson Bay	Gallinas Creek - San Pablo Bay	PS4 Detention basin, E. Vendola Dr., just north of its intersection	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	salt marsh	Cattails	25	25	1	25	625	N/A	1	1	Remove up to 1 ft of accumulated sediment from bottom of earthen detention basin.	Every 3 years	Long-reach Excavator, Hauler						X					X			Low.					x							
7	7-SOD	Richardson Bay	Gallinas Creek - San Pablo Bay	Sunny Oaks Drain, culvert inlets NW and NE of intersection of E.	Yes	Yes	No			Earthen Engineered Flood Control	No	No	3	grassland	Open water/cattails	100	100	3 - 4	10 - 12	1100	30-36 RCP	1	1	Remove accumulated sediment and vegetation from up to 50 linear feet of	Annually	Long-reach Excavator, Hauler		X				X			X				Upper watershed erosion on lands not owned by FC	Yes	Low					x							
Zone 9																																												
9	9-CCT	Corte Madera Creek	College Ct. Outfall	10-14 College Ave	Yes	Yes	Yes		Larkspur	Control	Yes		3	salt marsh	pickleweed,	12	12	2	8	96	36	1	2	Remove accumulated sediment from outfall	Every 1 - 3 years	Excavator		X				X			X				removal at site may be linked to Corte Madera Creek	Yes	Low		x										
	Site Removed from Sediment List 2021 9-CMC-2	Corte Madera Creek	Corte Madera Concrete Channel	Corte Madera Creek concrete channel outfall (including stilling basin) US to tidal limit (at Kentfield Rehab Hospital)	Yes	NO	Yes			Concrete Engineered Flood Control	Yes	Yes		concrete channel	Concrete channel - open water	4000	100 4100	1 - 4	30	123000		7	14	Remove sediment from 4100 ft of concrete channel US from the end of the concrete portion (including 100 LF at stilling basin). Equipment will be placed in-channel.	Every 7 years	Vactor (stilling basin), Long-reach Excavator, Loader, Hauler			X			X				X			Sediment from tidal action. Effectiveness of sediment removal at site may be linked to Corte Madera Creek Sediment Management - Dredging project currently in planning phase.	Yes	Medium			x	x								
9	9-CMC-1	Corte Madera Creek	Corte Madera Channel	From Kentfield Rehab US to Lagunitas Rd Bridge; sediment removal

Marin County Flood Control-Stream Maintenance Program

Sediment Removal Sites

6/11/2021

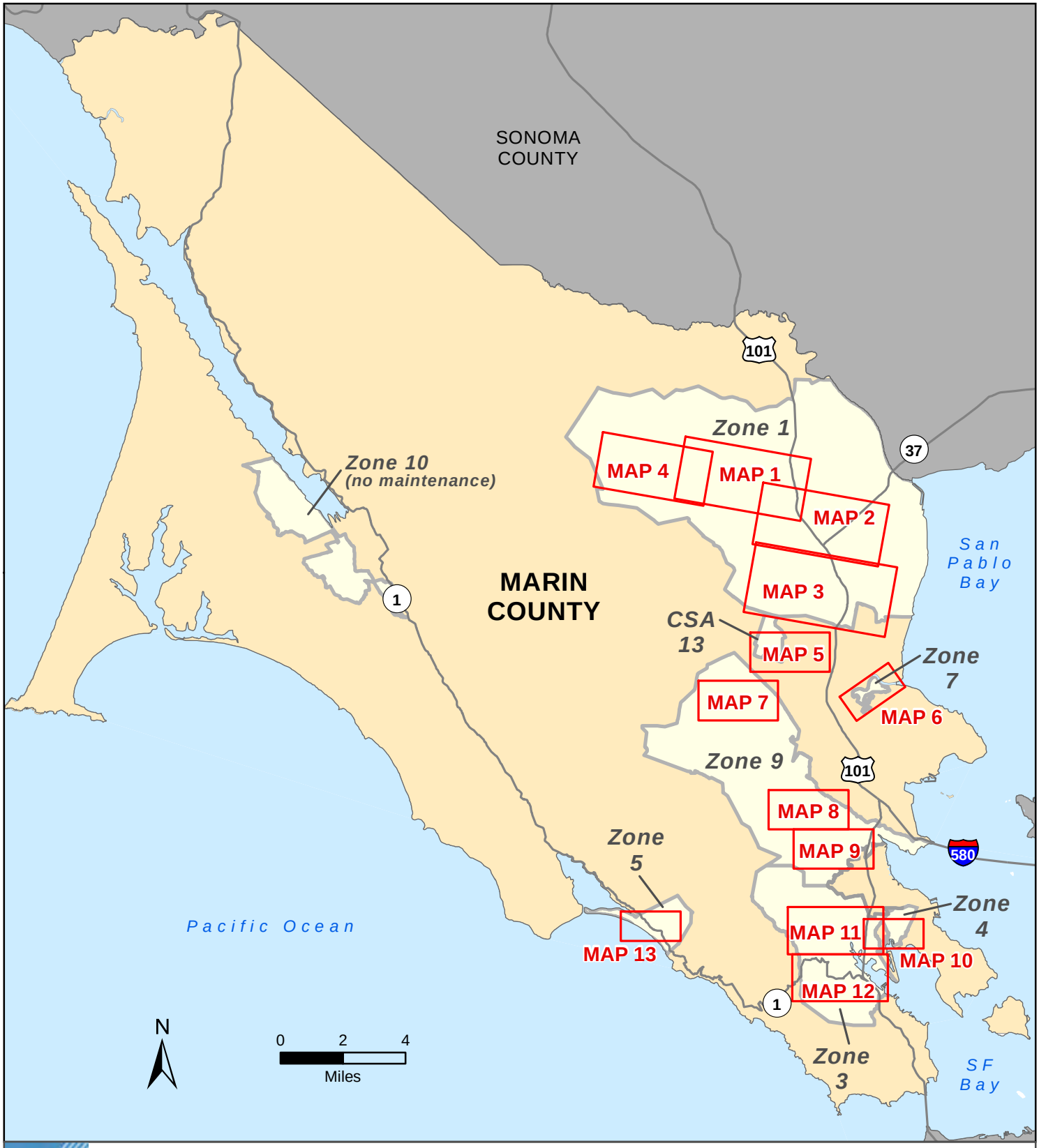
| | | |

APPENDIX C

MAPBOOK

Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control District County Overview and Map Index

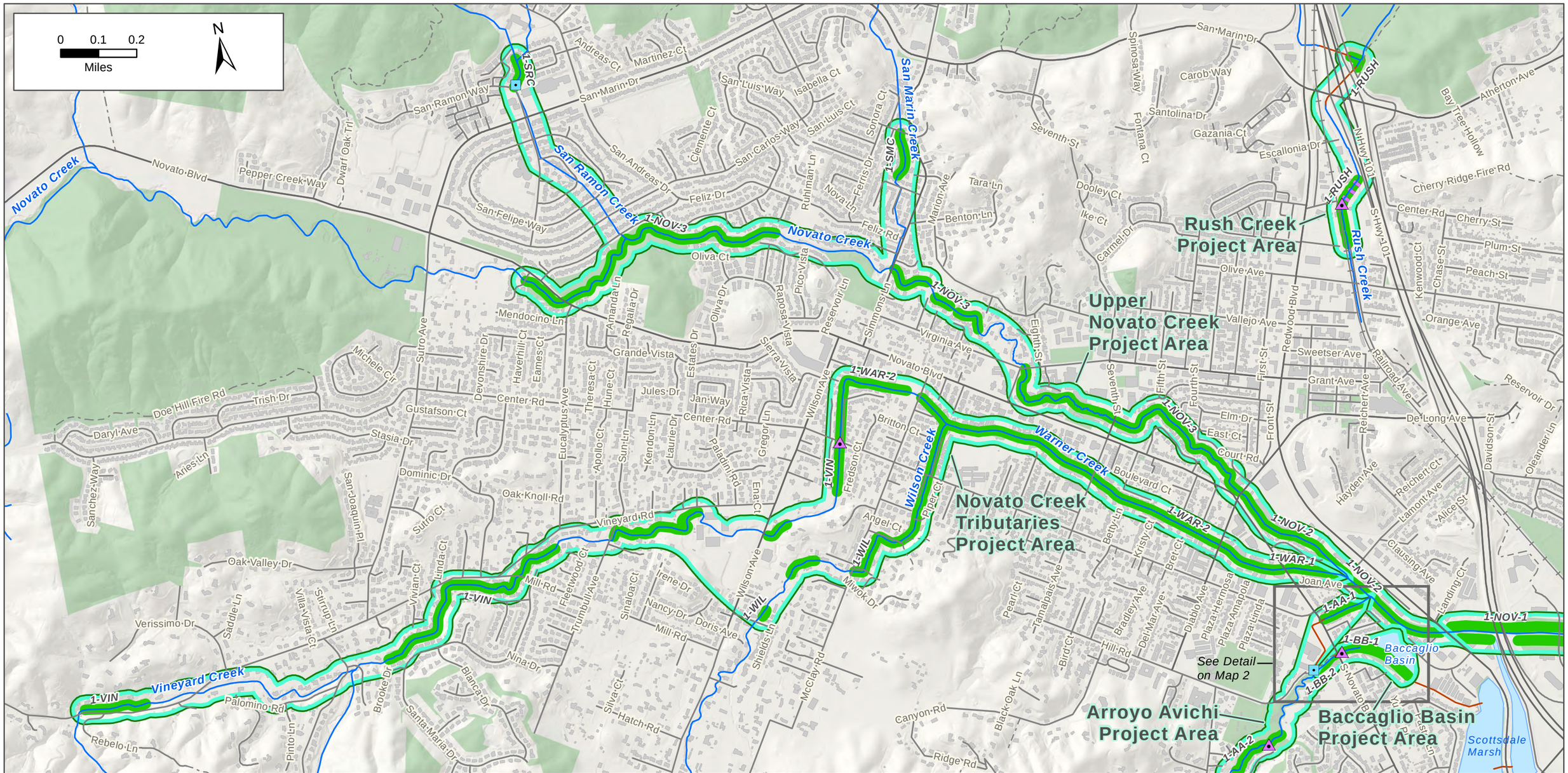
Map Extents

District Administrative Areas:
Flood Zones and County Service Area 13

Marin County Flood Control and Water Conservation District - June 2021

Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 1 - Central

MAP 1

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance
- Vegetation
- Sediment

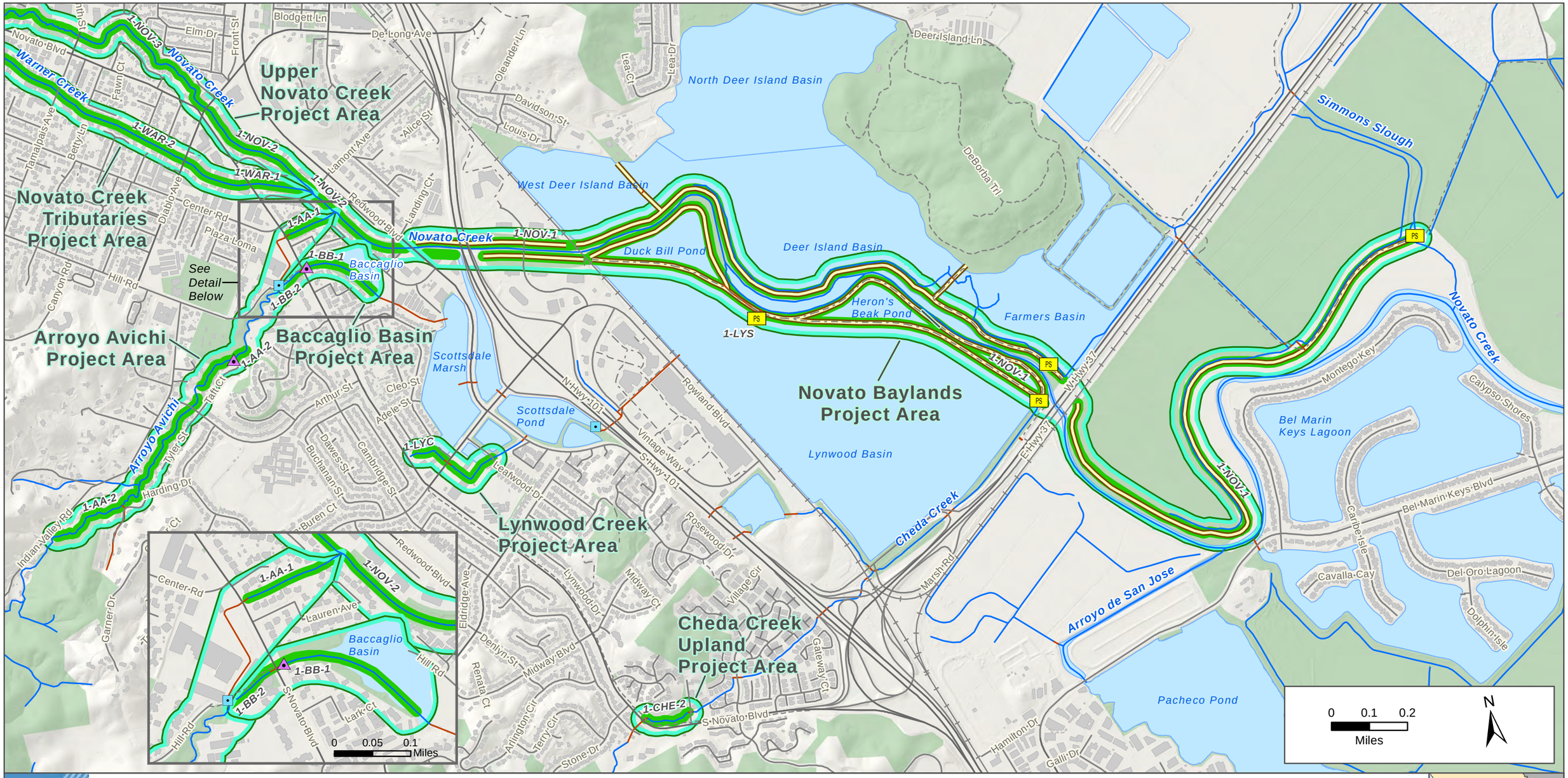
Stream
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 1 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 1 - East

MAP 2

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance
- Vegetation
- Sediment

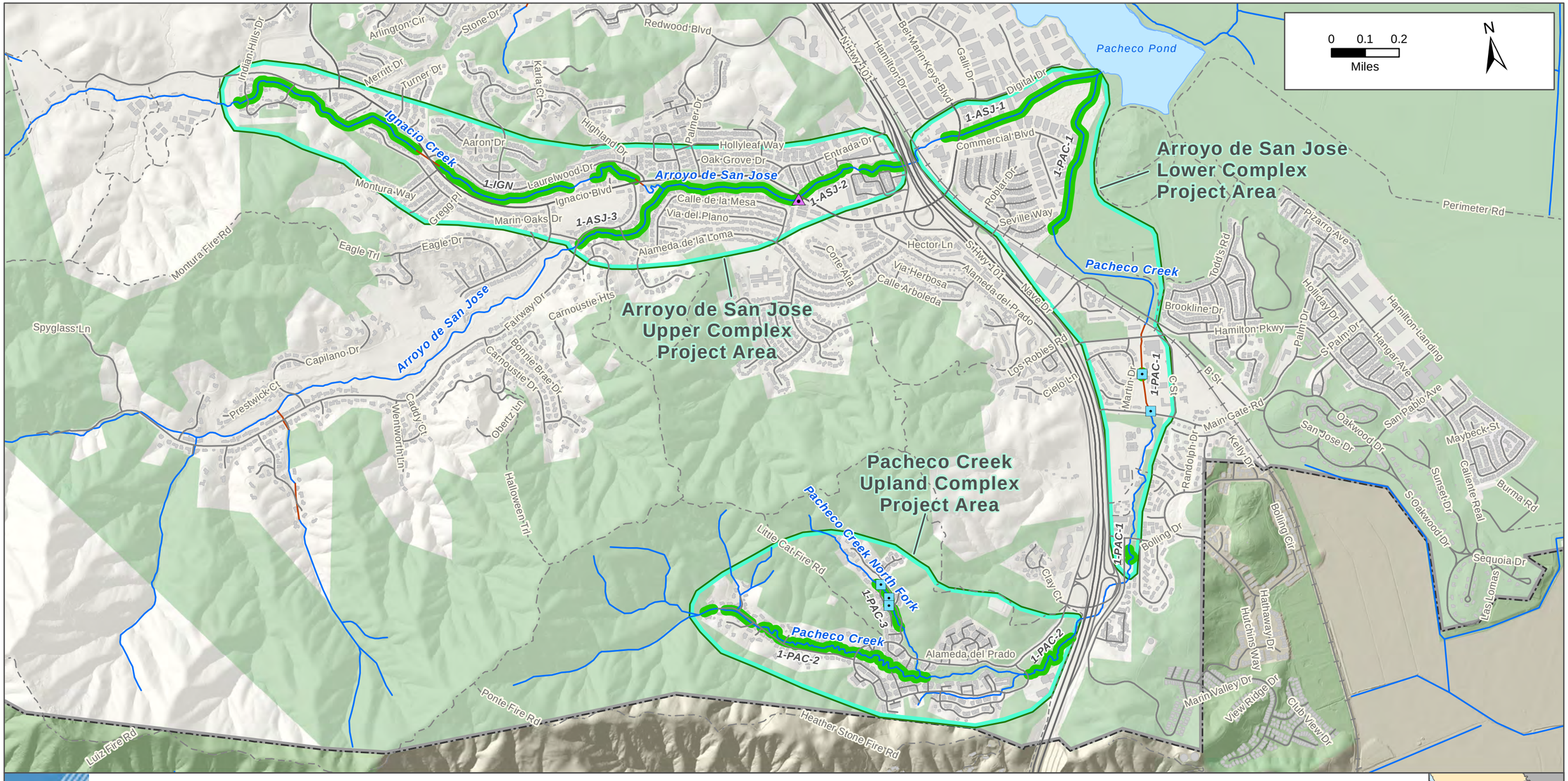
Stream
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 1 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



MARIN COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT

Flood Control Zone 1 - South

MAP 3

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance
- Vegetation
- Sediment

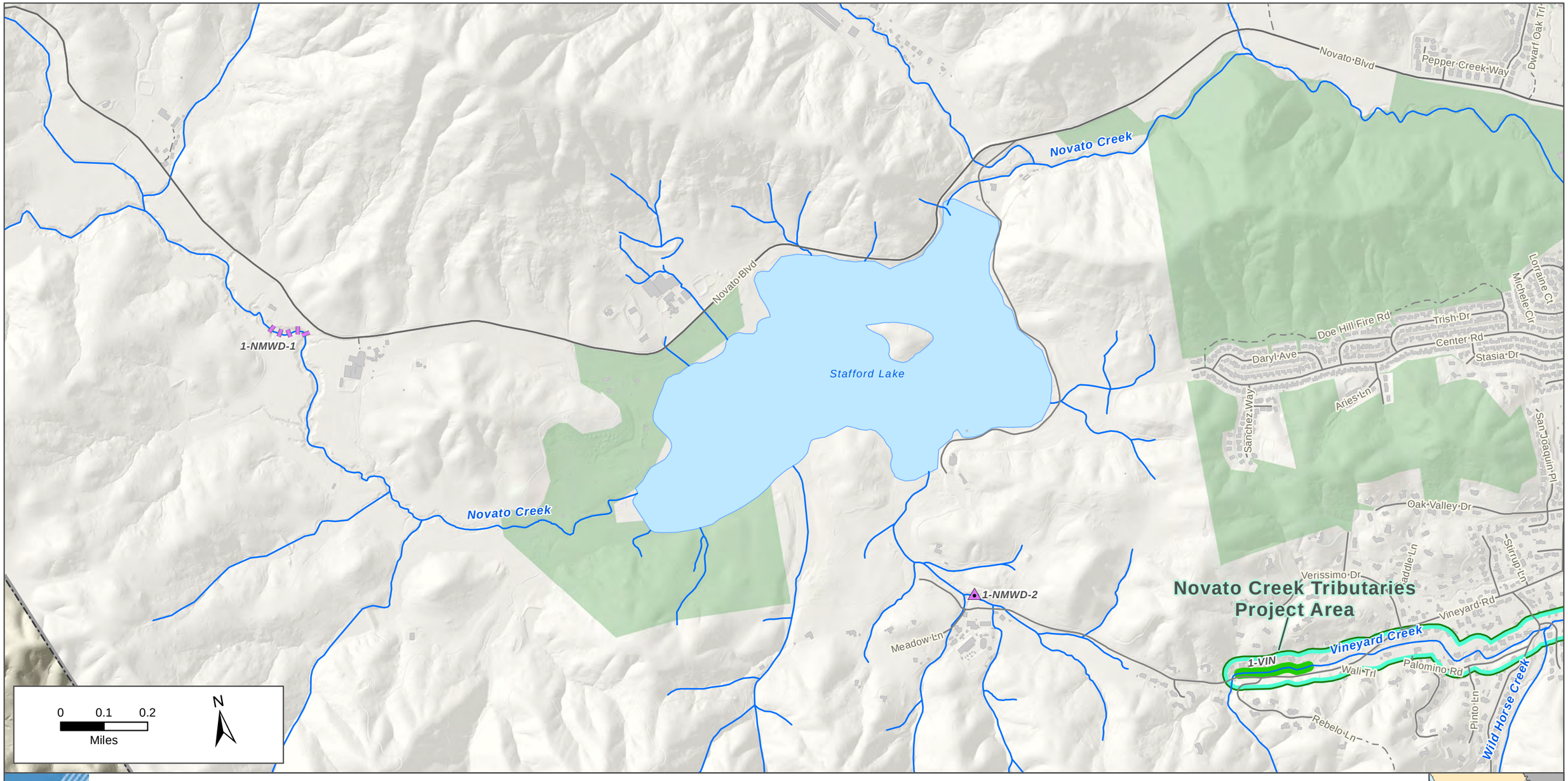
Stream
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 1 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



MARIN COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT

Flood Control Zone 1 - West

MAP 4

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance

- Vegetation
- Sediment

Stream

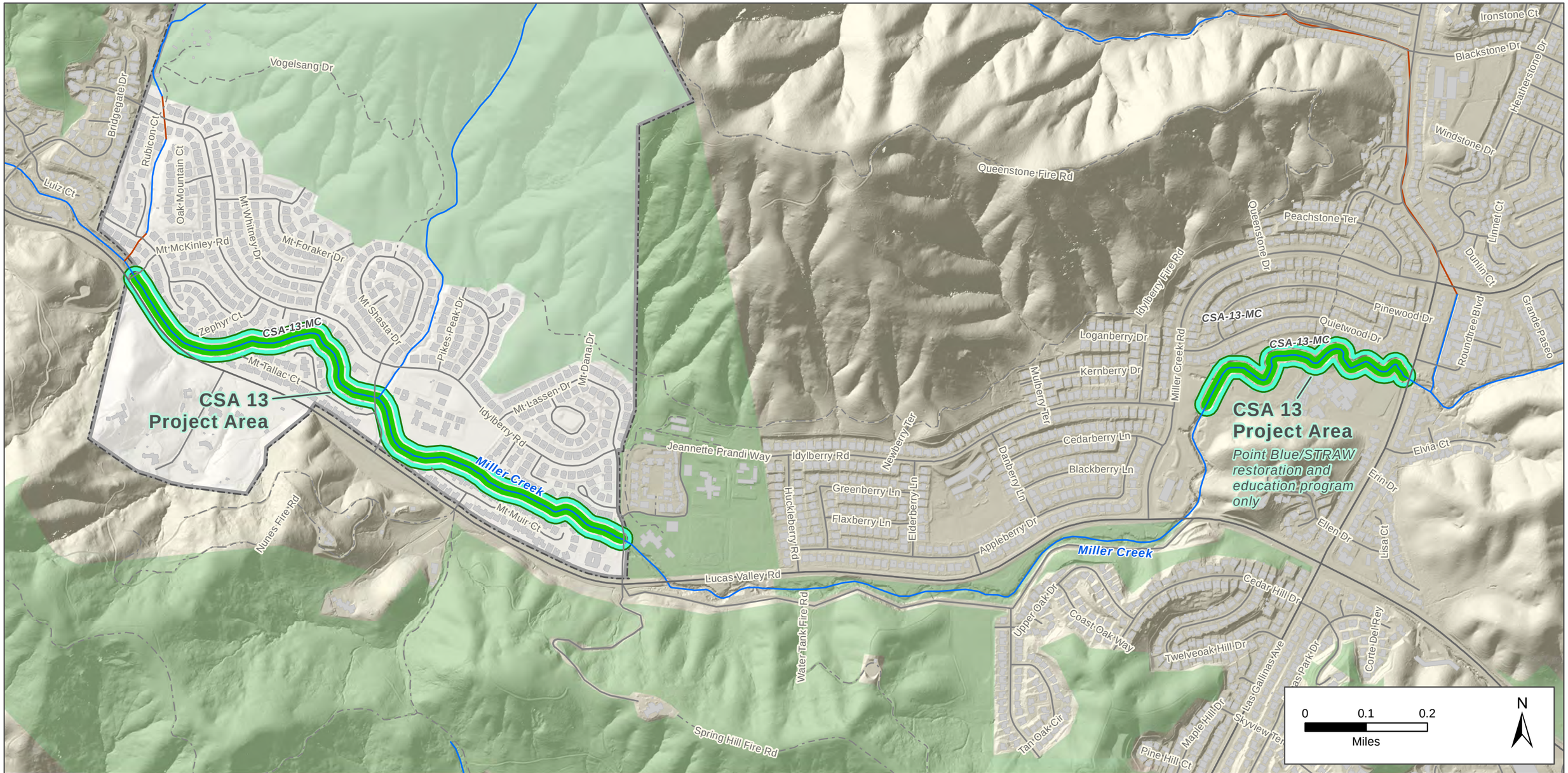
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 1 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



County Service Area 13 and adjacent

MAP 5

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance

- Vegetation
- Sediment

Stream

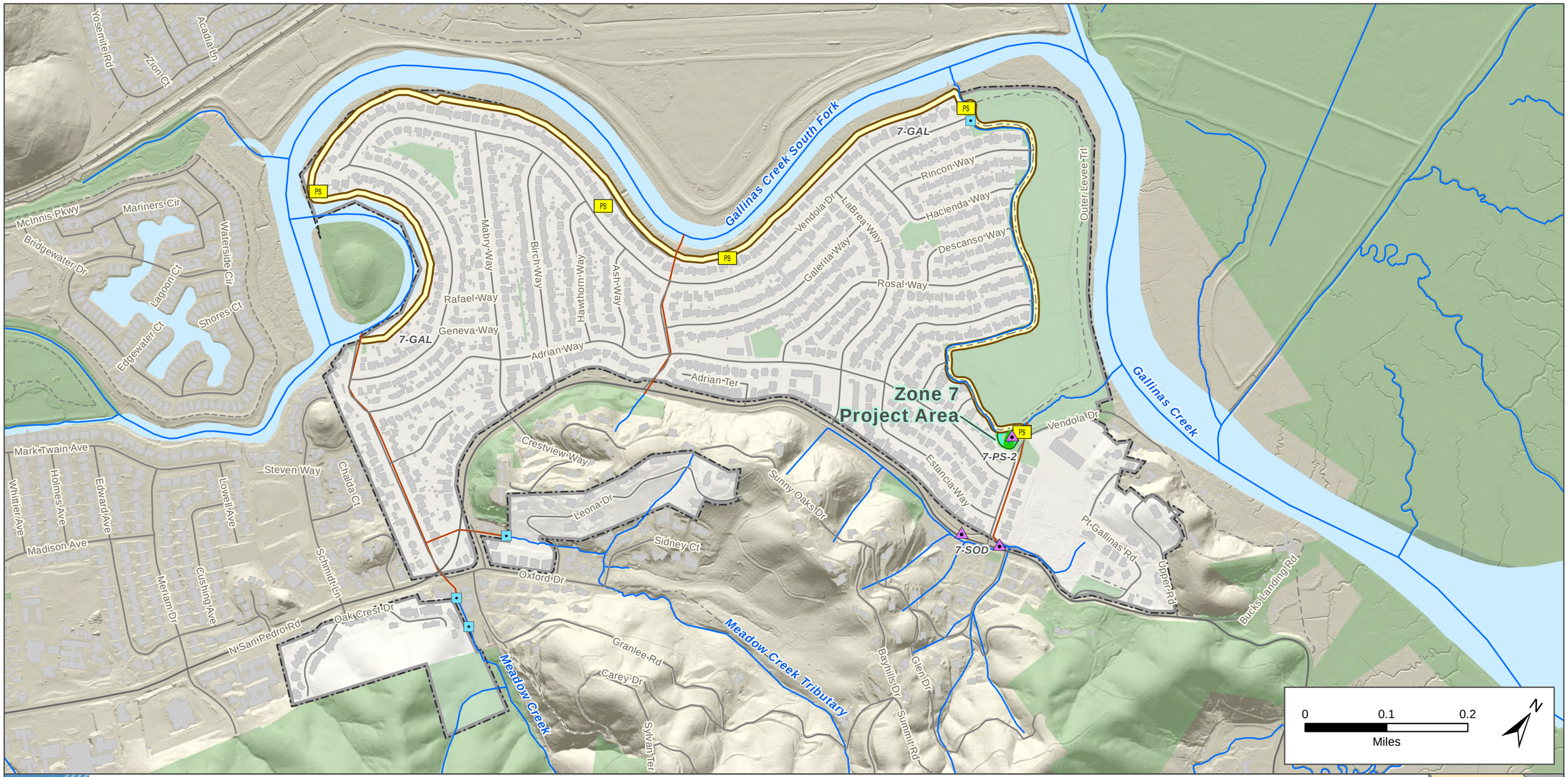
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- County Service Area 13 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 7

MAP 6

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance

- Vegetation
- Sediment

Stream

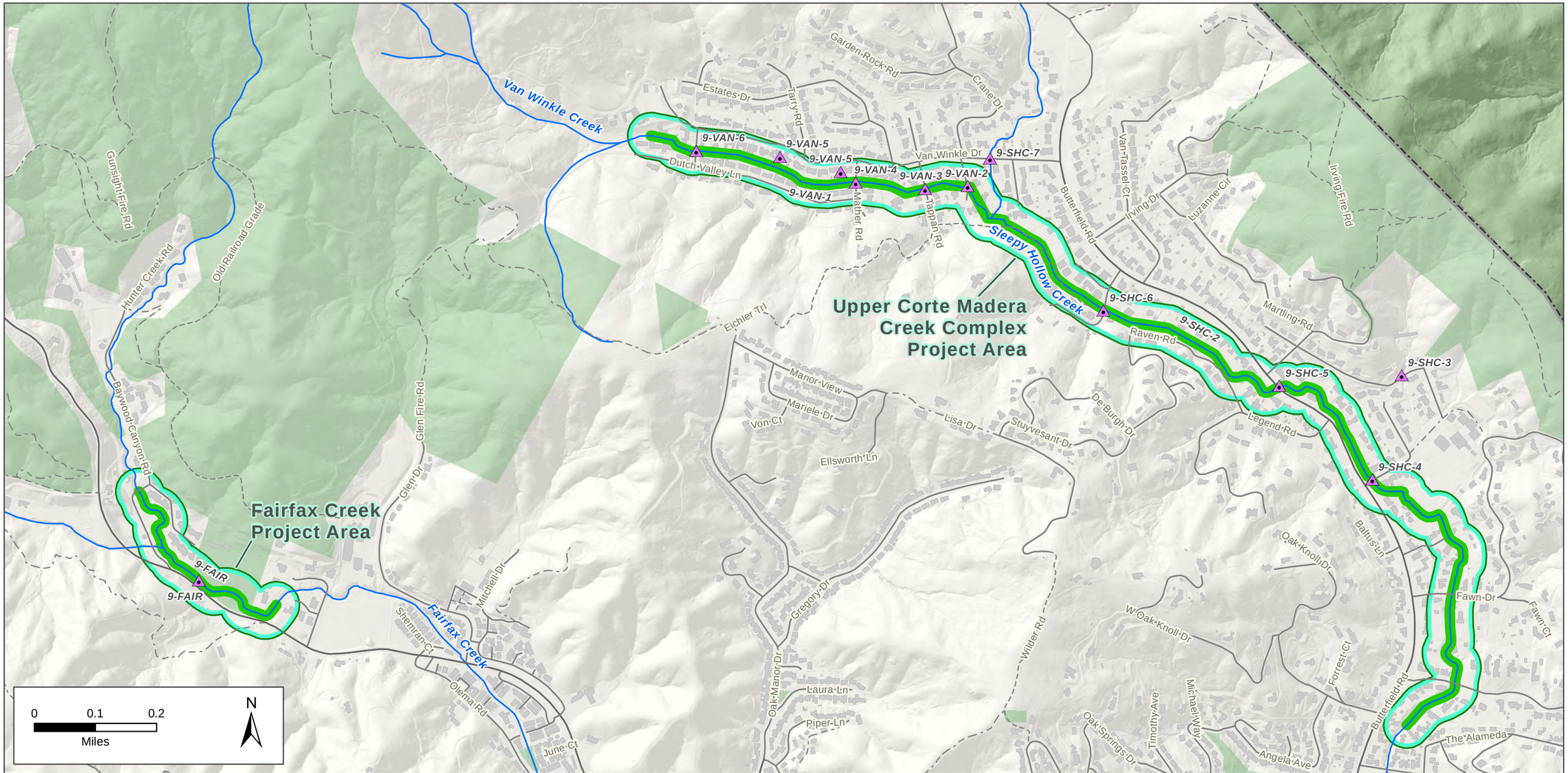
- Channel
- Culvert

- Trash Rack
- Pump Station
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 7 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 9 - Upper

MAP 7

Marin County Flood Control and Water Conservation District - Feb 2023

Vegetation Project Area

Creek Maintenance

- Vegetation
- Sediment

Stream

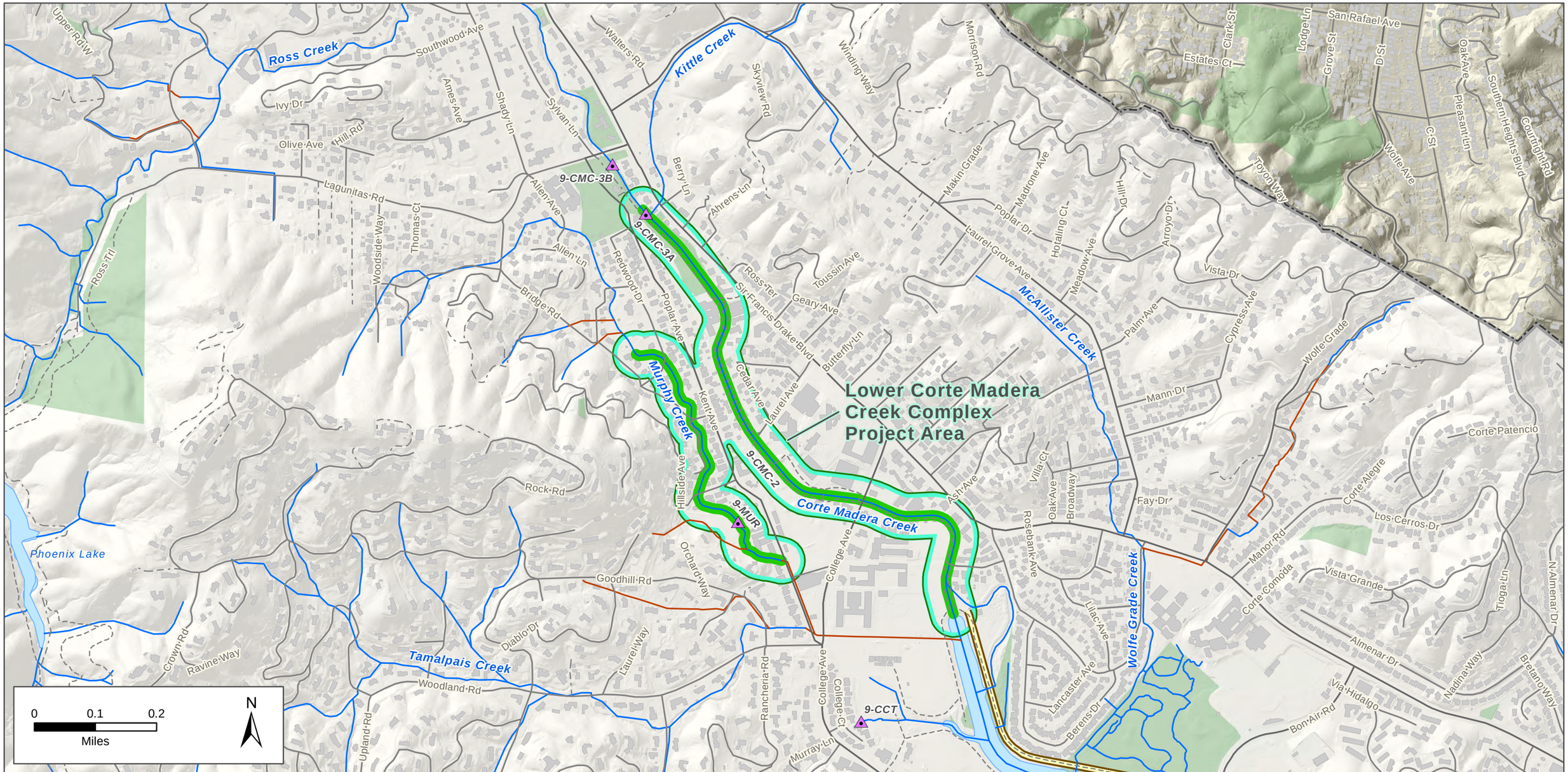
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 9 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 9 - Lower - North

MAP 8

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance
- Vegetation
- Sediment

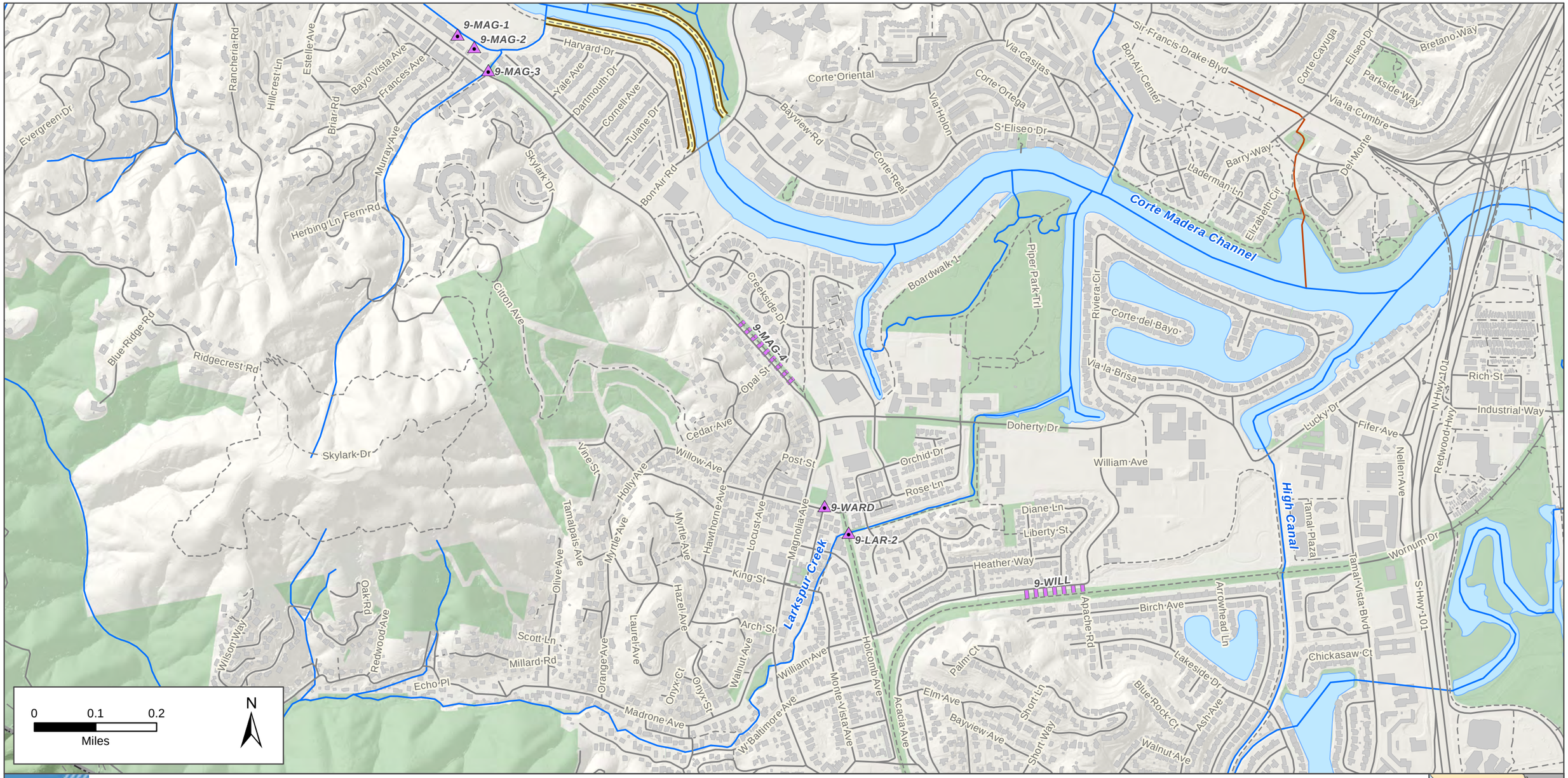
Stream
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 9 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 9 - Lower - South

MAP 9

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance
- Vegetation
- Sediment

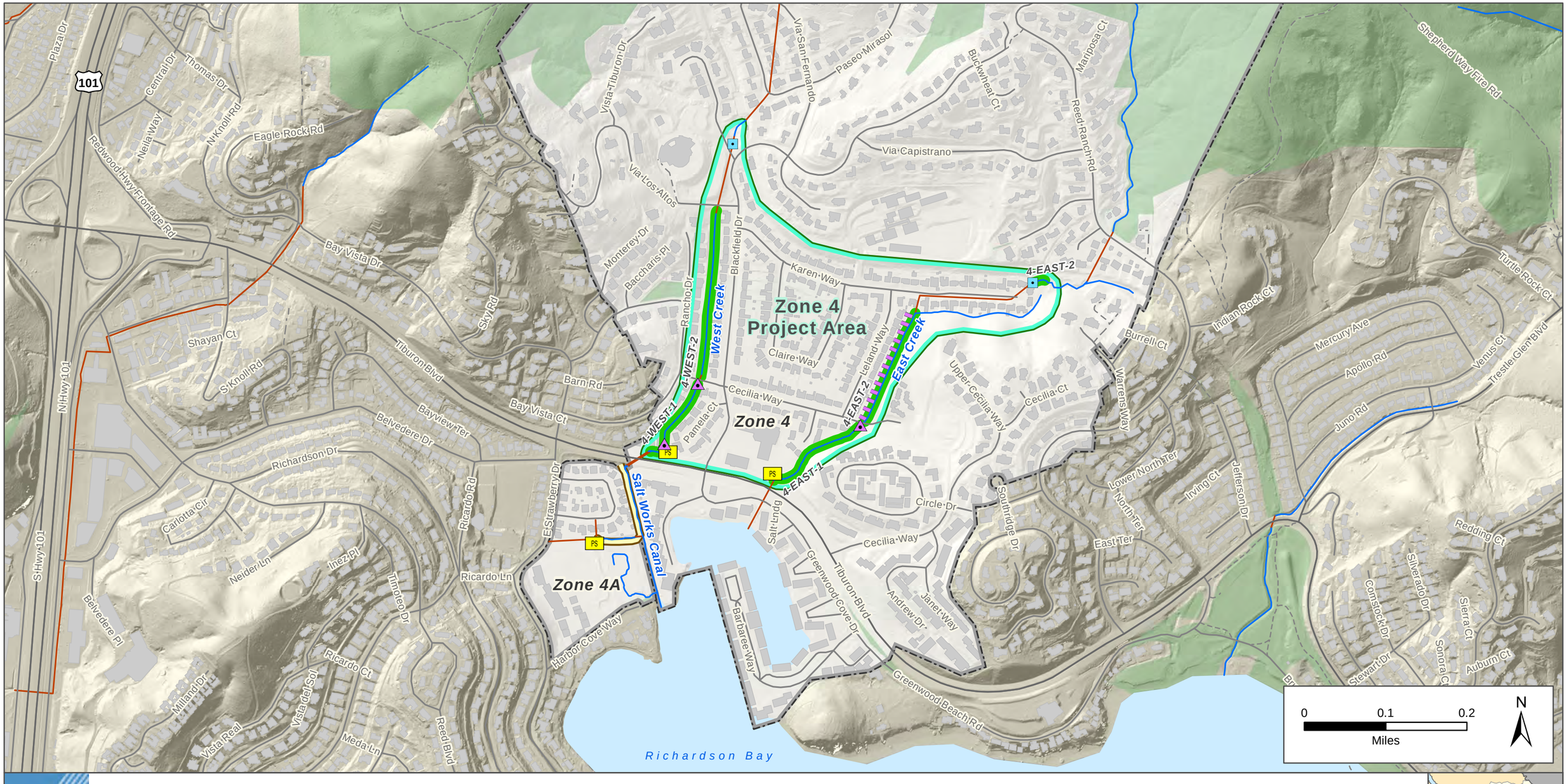
Stream
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 9 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 4 and 4A

MAP 10

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance

- Vegetation
- Sediment

Stream

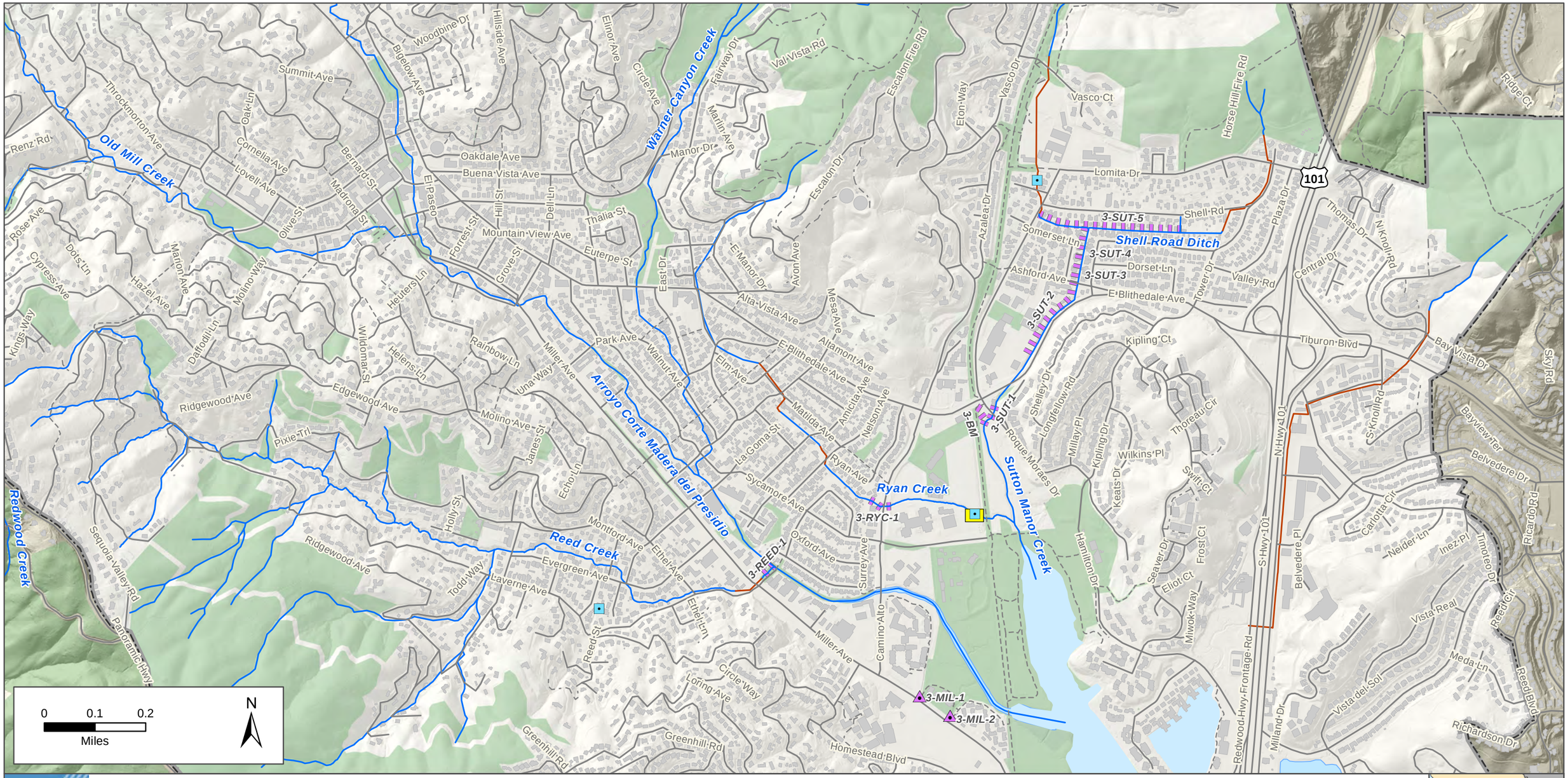
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 4 and 4A Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 3 - North

MAP 11

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance

- Vegetation
- Sediment

Stream

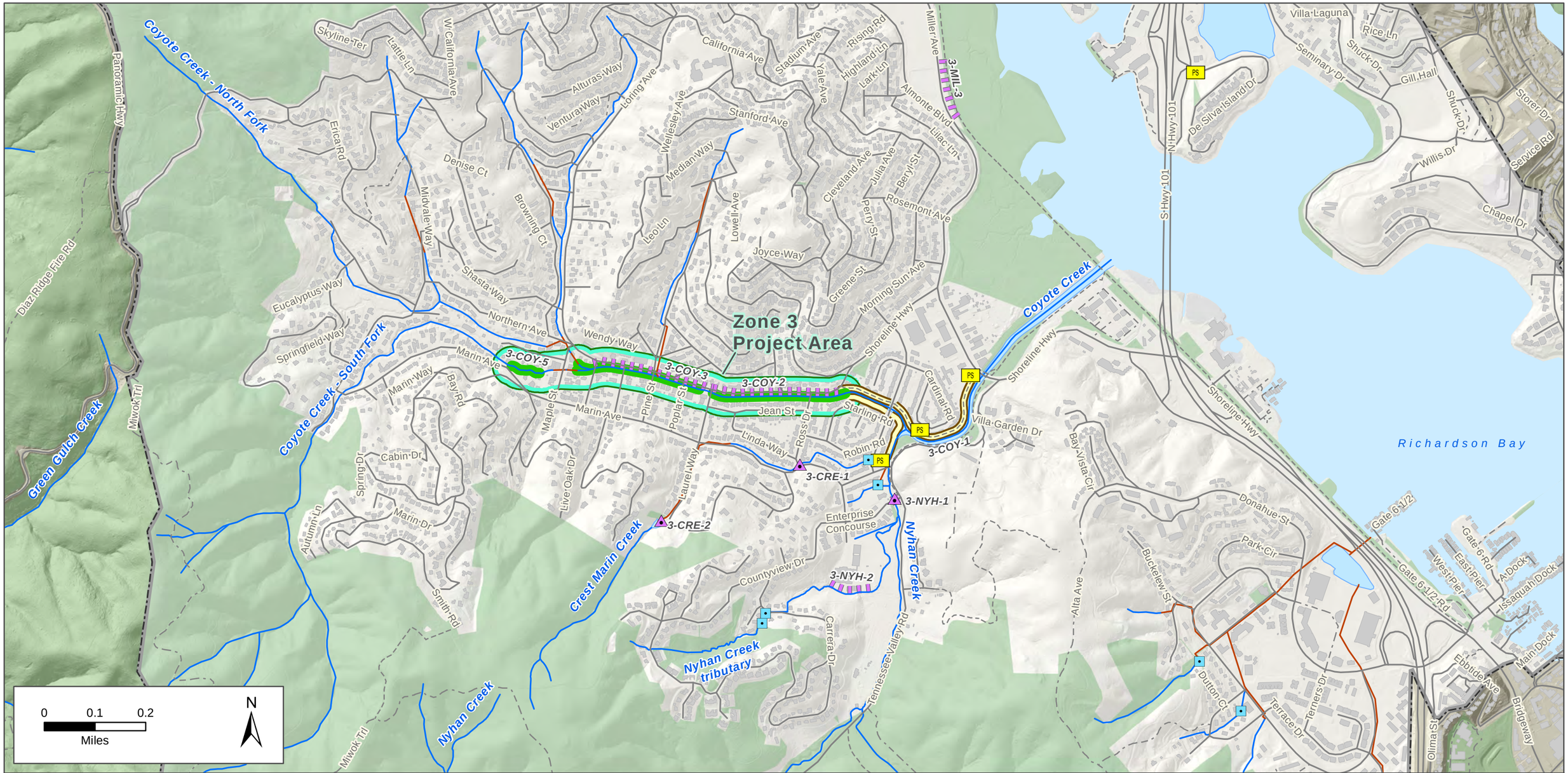
- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 3 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 3 - South

MAP 12

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance
- Vegetation
- Sediment

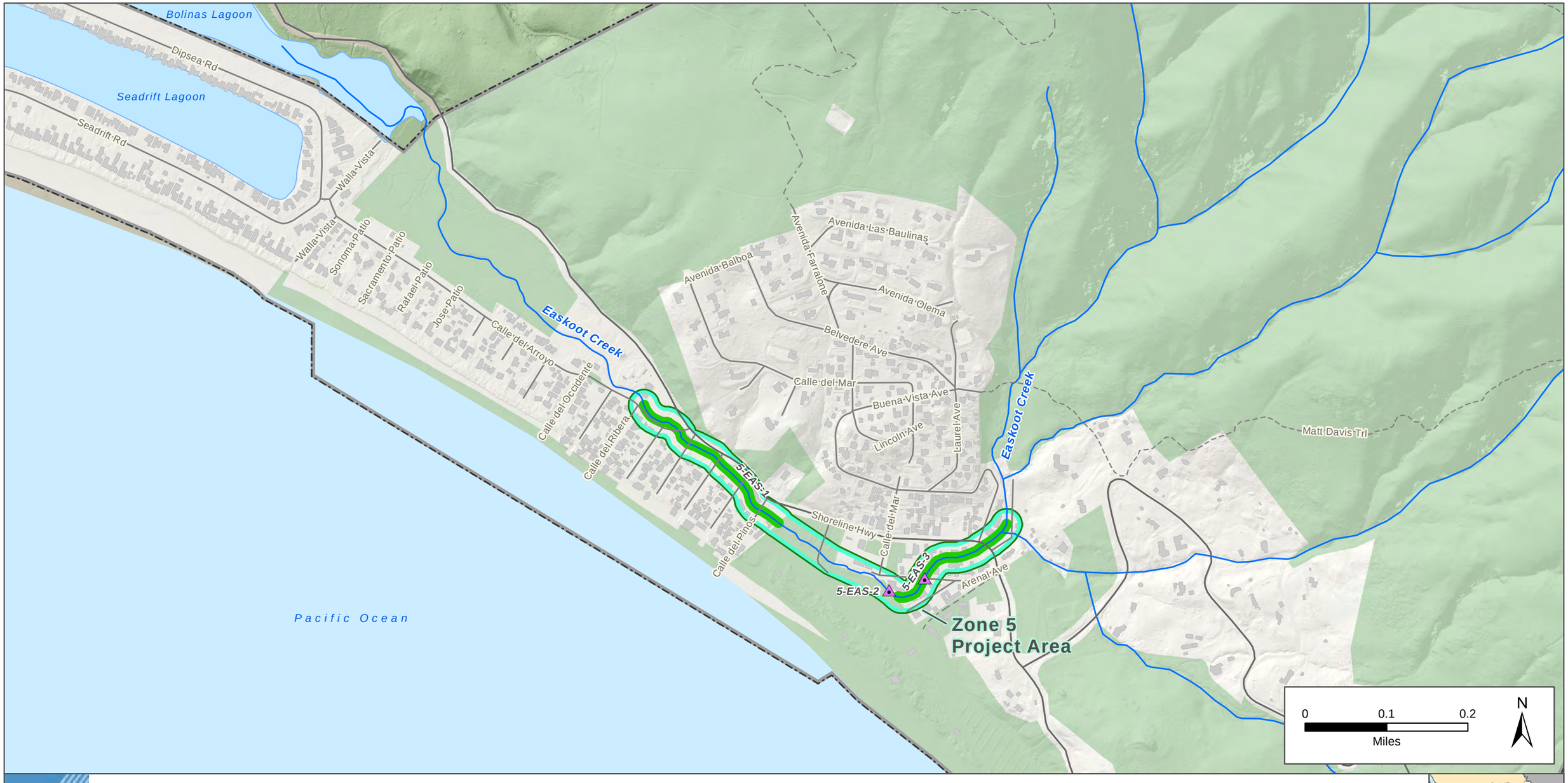
Stream
- Channel
- Culvert

- Trash Rack
- Pump Station
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 3 Administrative Boundary



Marin County Flood Control and Water Conservation District

Stream Maintenance Program (SMP)



Flood Control Zone 5

MAP 13

Marin County Flood Control and Water Conservation District - June 2021

Vegetation Project Area

Creek Maintenance

- Vegetation
- Sediment

Stream

- Channel
- Culvert

- Trash Rack
- Pump Station (PS)
- Levee Maintenance
- Building Footprint
- Public Land
- Flood Control Zone 5 Administrative Boundary



APPENDIX D

SITE FACT SHEETS

Flood Control Zone 1 - Novato

Site: **1-AA-1**
Arroyo Avichi


Arroyo Avichi downstream of South Novato Blvd.

Site Description:
This work site is tidal. It stretches between the confluence with Novato Creek upstream to the end of the culvert under S. Novato Boulevard (approximately one city block).

The predominant land use is residential; the creek flows behind backyards on both sides.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.; dominant tree species are bays, oaks, and willows.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance, tidegate maintenance, and sediment removal downstream of the Novato Blvd culvert to reduce the frequency of major sediment removal as part of the Novato Creek Maintenance Sediment Removal Project which has historically occurred every 4 years.

Maintenance Trigger:
No floodplain, between houses. Manage for removing flow-diverting obstructions and bank stability. ($n < \sim 0.04$). Remove sediment from up to 150 feet downstream of the Novato Blvd Culvert when there is less than 3 feet of clearance to encourage sediment to flow out of the culvert. This should reduce the frequency of major sediment removal in Arroyo Avichi as part of the Novato Creek Maintenance Sediment Removal Project which has historically occurred every 4 years.

Flood Control Zone 1 - Novato

Best Management Practices:
A-67; A-69; A-73; A-103; A-107; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM- 2; VDM-3; VDM-4; VR-4a; VR-4b; VR-5.

Flood Control Zone 1 - Novato

Site: **1-AA-2**
Arroyo Avichi



Arroyo Avichi at Indian Valley Rd and Arthur St.

Site Description:
The work site is non-tidal and stretches from just upstream of the Arroyo Avichi Bypass structure upstream to 1575 Indian Valley Road.

The predominant land use is residential, with large residential lots on the left bank and more closely hemmed in with houses on the right bank.

Type of Stream Channel:
Earthen, Modified

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest. The predominant tree types are bays, oaks, and willows.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

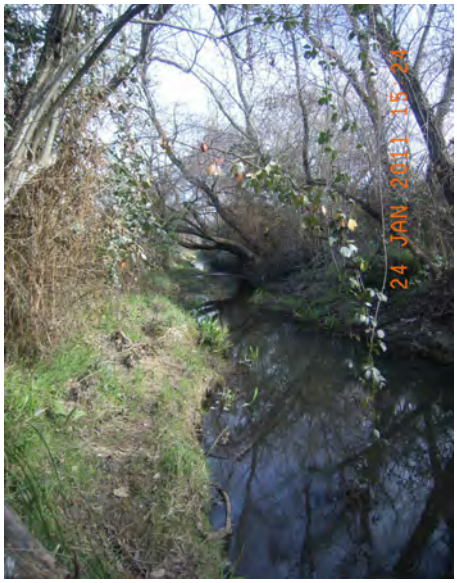
Maintenance Activities:
Vegetation maintenance, sediment removal and erosion control.

Maintenance Trigger:
Novato Creek hydraulic (RAS) model includes this location. No floodplain available. Ongoing complaint of bank stability threatening home; sediment is sometimes removed from opposite bank to relieve pressure on the eroding bank and reduce sediment accumulation in 1-BB-1.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-ASJ-1**
Arroyo de San Jose



Arroyo de San Jose near Pacheco Pond.

Site Description:
The work site is non-tidal (behind levees) and stretches from Pacheco Pond upstream to Highway 101.

The predominant land use is commercial.

Type of Stream Channel:
Earthen, Modified

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest. The predominant tree type is willows.

Potentially-occurring special-status species:
Hayfield tarweed, northwestern pond turtles have been observed in the creek on the Marin Humane Society property.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; PLA-1, REP-1.

Maintenance Activities:
Fire fuel reduction, and vegetation maintenance, and erosion control.

Maintenance Trigger:
No Hydraulic Model. Floodplain n value exceeds 0.08 (light -medium brush).

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-ASJ-2**
Arroyo de San Jose



Arroyo de San Jose just upstream of Ignacio Blvd road crossing, showing area of sediment removal.

Site Description:
The work site is above tidal influence and has a concrete bottom. It stretches from the west side of Highway 101 to just upstream of the Ignacio Blvd road crossing, including a silt basin.

The predominant land use is residential and commercial.

Type of Stream Channel:
Concrete, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest. Tree species include oaks, alders, bays, and willows.

Potentially-occurring special-status species:
Hayfield tarweed.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, and erosion control.

Maintenance Trigger:
No Hydraulic Model. No floodplain available to handle out of bank flow without causing damage. Manage channel for Mannings n < ~0.045 (effective flow).

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-ASJ-3**
Arroyo de San Jose



Site Description:
This work site is a fairly narrow, non-tidal riparian corridor with a natural bottom. There are some utilities within the channel (e.g., culverts, roadways) where the channel is concrete upstream and downstream of those utilities. The channel extends upstream from the silt basin to Birdie Drive.

The predominant land use is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest. Tree species present include oaks, alders, bays, and willows.

Potentially-occurring special-status species:
Hayfield tarweed.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:
Vegetation maintenance and erosion control.

Maintenance Trigger:
No Hydraulic Model. Some floodplain available. Deeply incised. Manage for bank instability.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-BB-1**
Baccaglio Basin


Baccaglio Basin near S. Novato Blvd access gates.

Site Description:
This non-tidal basin collects rainwater, street drainage, and rarely water from the Arroyo Avichi Bypass, and drains to Scottsdale Pond. The basin is hemmed in by residential development, with a small area above the banks of Novato Creek.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is diked baylands. The lower portion is largely marsh dominated by cattails and non-native grasses; the upper portion has willows and oaks.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal; and erosion control.

Maintenance Trigger:
Remove sediment as needed to maintain low flow channel and positive drainage through basin.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-BB-2**
Baccaglio Basin Bypass


Bypass of Arroyo Avichi to Baccaglio Basin.

Site Description:
The work site is above tidal influence and consists of a high-flow, concrete bypass; in high flow events, water will flow into the bypass and through a culvert under S. Novato Blvd to Baccaglio Basin instead flowing directly to Novato Creek.

Surrounding land use is commercial and residential.

Type of Stream Channel:
Concrete, Modified

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
Although the bypass itself is concrete, the north coast riparian scrub/forest vegetation on the banks consists of oaks, bays, willows, Himalayan blackberry and English ivy.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction and vegetation maintenance.

Maintenance Trigger:
Clear any debris on trash rack or likely to block flow.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-CHE-1**
Cheda Creek



Cheda Creek pump station.

Site Description:
The work site is a small area around the Cheda Pump Station. The work area is above the tide line.

Type of Stream Channel:
Earthen, Modified

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The pump station sits on the levee top in an area of annual grassland. Dominant species are nonnative grasses, with some coyote brush.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Pump station maintenance.

Maintenance Trigger:
Six-year cycle of maintenance.

Best Management Practices:
A-229; A-103; A-107; EV-1; EV-2; NR-1; NR-3; VR-4a; VR-4b; VR-5.

Flood Control Zone 1 - Novato

Site: **1-CHE-2**
Cheda Creek


Cheda Creek.

Site Description:
The work site is the non-tidal stretch of Cheda Creek between Cowbarn Ln and S. Novato Blvd. The area is generally residential, but upslope and outside of the riparian corridor is an area of non-native annual grassland.

Type of Stream Channel:
Earthen, Modified

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest; the narrow riparian corridor is dominated by bays and oaks. There are cattails at the upstream culvert outfall, and ornamental fruit trees and palms are present as well.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and erosion control.

Maintenance Trigger:
No Hydraulic Model. Cattails removed to prevent Novato Blvd culvert obstruction. A more defined trigger will be developed in the future when funding becomes available.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-IGN**
Ignacio Creek



Site Description:
The work site is a fairly narrow, non-tidal riparian corridor constrained by Ignacio Blvd on one side and residential development on the other side.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The dominant vegetation type is north coast riparian scrub/forest; trees present on site include willows, oaks, and bays.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, and erosion control.

Maintenance Trigger:
No Hydraulic Model. No floodplain, houses and development all along. Manage channel for Mannings n < 0.045 and bank stability.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-LYC**
Lynwood Creek



Lynwood Creek at Rowland Blvd.

Site Description:
The non-tidal work site extends from S. Novato Blvd to Redwood Blvd at Scottsdale Pond. The creek flows through a mix of commercial, residential, and open, marshy areas in the vicinity of the Highway 101/Rowland Blvd interchange.

Type of Stream Channel:
Earthen, Modified

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation community is north coast riparian scrub/forest dominated by willows; southwest of Rowland Blvd, the canopy is more open, with cattails and largely non-native herbaceous species on the banks.

Potentially-occurring special-status species:
Northwestern pond turtles have been observed in the site vicinity.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; REP-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, and erosion control.

Maintenance Trigger:
No Hydraulic Model. Vegetation removed when it obstructs the channel more than the culvert at Rowland Blvd can handle.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; REP-1; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-LYS**
Lynwood Slough



Site Description:
The work site is at the Lynwood Pump Station at Lynwood Slough (behind the Vintage Oaks shopping center). The pump station is located on the slough side of the Novato Creek levee.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The site is located in annual grassland, dominated by non-native grasses, fennel, and bull mallow.

Potentially-occurring special-status species:
Northwest pond turtles are known to use nearby adjacent freshwater pond.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; REP-1.

Maintenance Activities:
Sediment removal and pump station maintenance.

Maintenance Trigger:
No Hydraulic Model. Vegetation removed when it obstructs the channel more than the culvert at Rowland Blvd can handle.

Best Management Practices:
A-43; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4a; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-NMWD-1**
North Marin Water District



Site Description:
This site is non-tidal on private property (Grossi Ranch) on Novato Creek upstream of Stafford Lake.

Land use is ranch/agriculture.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest along the creek, with oaks and willows the dominant tree species; California annual grassland habitat is immediately adjacent outside the riparian corridor.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal and vegetation maintenance.

Maintenance Trigger:
The maintenance trigger is less than 2 ft of clearance between the sediment level and weir top.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-NMWD-2**
North Marin Water District



Site Description:
This site is on North Marin Water District land on a tributary just upstream of Stafford Lake and adjacent to the Indian Valley Golf Course.

Land use is open space and recreation.

Type of Stream Channel:
Earthen, Modified

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest along the creek, with bays the dominant tree species and ferns and Himalayan blackberries in the understory.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal and vegetation maintenance.

Maintenance Trigger:
The maintenance trigger is less than 2 ft of clearance between the sediment level and weir top.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-NOV-1**
Novato Creek



Novato Creek. SMART tracks in foreground, Lynwood Slough and Duckbill Pond in center, Bel Marin Keys community in background. Mouth enters bay off photo to the left.

Site Description:
This work site includes the earthen levees on both sides of Novato Creek from the mouth upstream to Redwood Blvd just west of Highway 101. The area is tidally-influenced.

From Redwood Blvd to the SMART railroad tracks, the predominant land use is commercial; downstream of the tracks, the area is open and maintained for flood control and wildlife purposes.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The dominant vegetation type is California annual grassland. The tops of the levees and the sides of ponds and sloughs are dominated by coyote brush, fennel, acacia, bull mallow, and nonnative grasses; the upper banks on the streamside of the levees are dominated by fennel with pickleweed and saltgrass on the lower banks.

Potentially-occurring special-status species:
Steelhead trout, California Ridgway's rail, California black rail, salt marsh harvest mouse, northwestern pond turtle, and raptors and wading birds.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; FISH-1, BIRD-1, BIRD-3, MAMM-1; REP-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, erosion control, and pump station, tide-gate, and levee maintenance.

Maintenance Trigger:
RAS Hydraulic Model exists. No Floodplain available. Constructed for Q50 but ~obs Q10 service. Manage channel for n < 0.03, margins < 0.04.

Flood Control Zone 1 - Novato

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-NOV-2**
Novato Creek



Site Description:
This work site is a tidally-influenced corridor that extends from Redwood Blvd to the upper extent of tidal influence at Novato Fair shopping Center. The right bank of the lower section is concrete-lined.

The general land use is commercial and residential.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The dominant vegetation type is north coast riparian scrub/forest with willows and heritage oaks.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:
Remove downed trees and branches, trim cattails and pluck out select roots for maintaining a small low flow channel, and stabilize banks as needed.

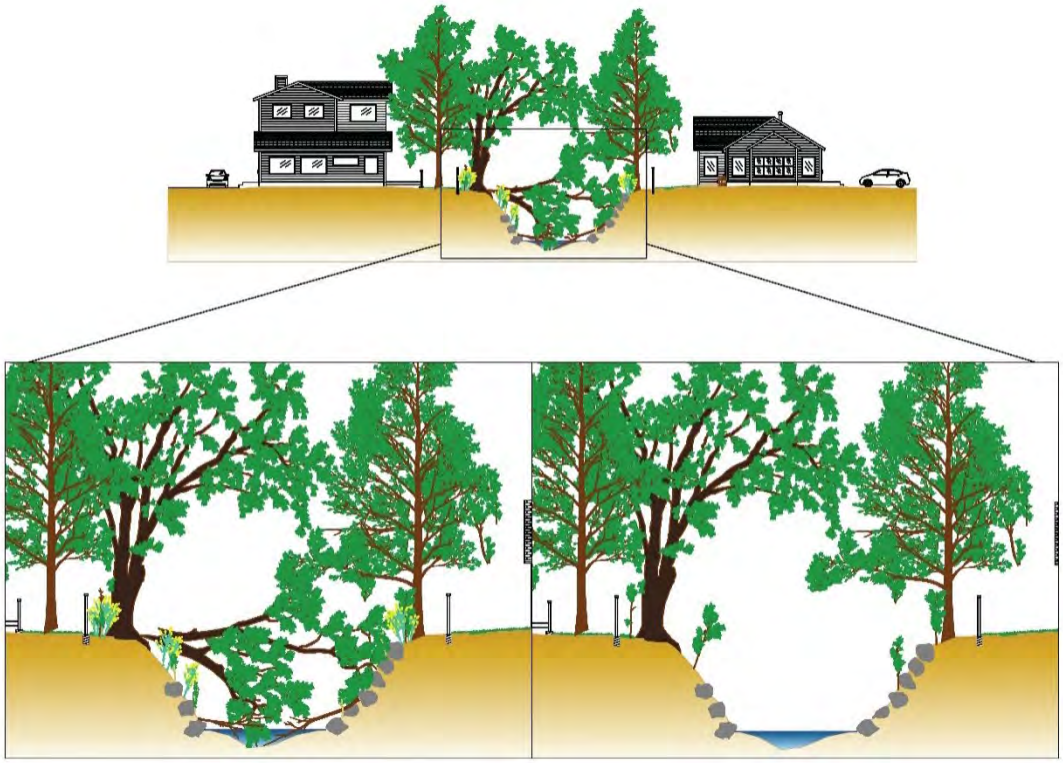
Maintenance Trigger:
RAS Hydraulic Model exists. No Floodplain available. Constructed for Q50 but ~obs Q10 service. Manage channel for n < 0.03, margins < 0.04. A low-flow channel less than 2 feet wide triggers need to pluck out cattail roots to allow for passage of fish and sediment through the reach. This should reduce the need for major sediment removal.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-

229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Pictogram:

Example of a Modified Earthen Channel
(e.g., 1-WAR-1, 1-NOV-2)



Before Annual Maintenance **After Annual Maintenance**

Flood Control Zone 1 - Novato

Site: **1-NOV-3**
Novato Creek



Novato Creek at Miwok Park.

Site Description:
This site consists of several discontinuous sections of Novato Creek from Novato Fair shopping center upstream to Thorsen Ct; all sections are similar as they are natural, non-tidal, riparian corridors amidst residential and commercial land uses.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest; and the dominant tree species are bays, oaks, willows. The restored Phase 8 portion has been planted with native species including box elders, blue elderberry and coffeeberry.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:
Remove downed trees and branches. Cattail management by plucking out the roots for a low flow channel and trimming the flanks. Erosion control.

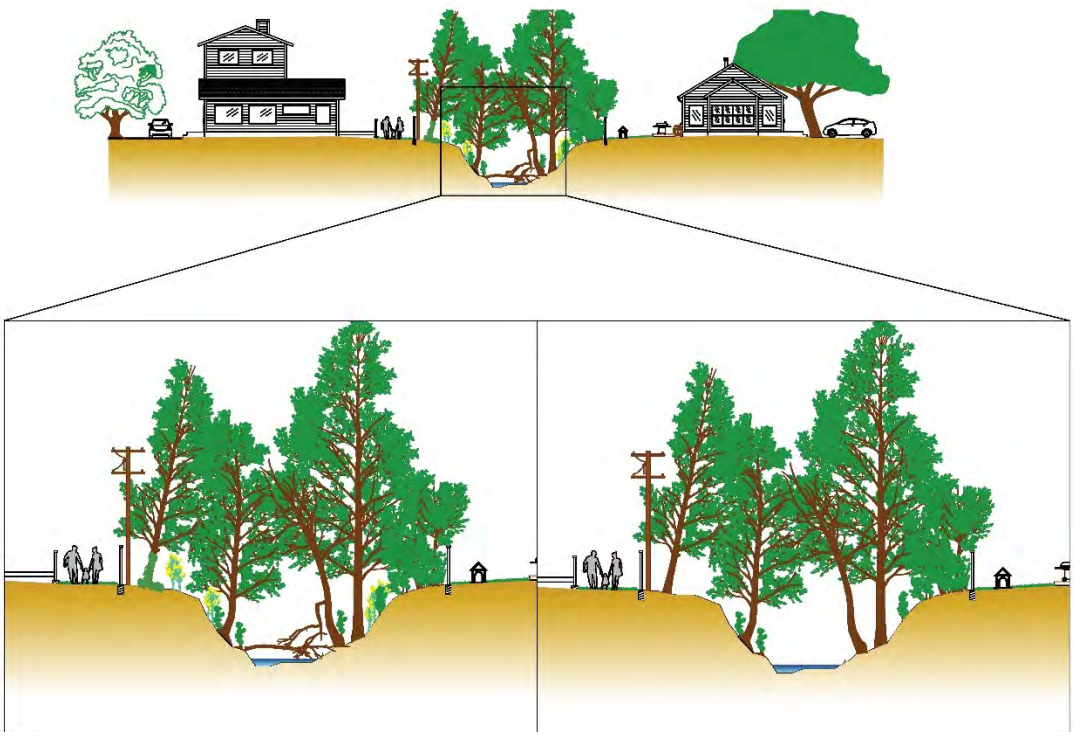
Maintenance Trigger:
RAS Hydraulic Model exists. No Floodplain available. Constructed for Q50 but ~obs Q10 service. Manage channel for N < 0.03, margins < 0.04. A low-flow channel less than 2 feet wide triggers need to pluck out cattail roots to allow for passage of fish and sediment through the reach. This should reduce the need for major sediment removal.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-

229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Pictogram:

Example of a Natural Channel
(e.g., Novato Creek downstream of Novato Boulevard [1-NOV-3] and 1-WAR-2)



Before Annual Maintenance **After Annual Maintenance**

Flood Control Zone 1 - Novato

Site: **1-PAC-1**
Pacheco Creek



Site Description:
The work site is non-tidal and includes several discontinuous stretches of Pacheco Creek east of Highway 101. The adjacent land uses include residential, commercial, and open areas.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest. The downstream portions are dominated by non-native herbaceous plants, with some shrubs; the upstream portions support oaks, willows, and a few alders.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, and erosion control.

Maintenance Trigger:
No RAS model. Variable floodplain availability, low gradient. Manage for channel n < 0.04 and floodplain < 0.08 (medium/dense brush) where present.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-PAC-2**
Pacheco Creek



Site Description:
The site is above tidal influence and includes several discontinuous sections of Pacheco Creek west of Highway 101. The riparian corridor is constrained on both sides by residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The site consists of north coast riparian scrub/forest. Willows, oaks, and bays are the dominant tree species.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and erosion control.

Maintenance Trigger:
No RAS model. High gradient, incised, no floodplain manage for bank stability and channel n < 0.04.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-PAC-3**
Pacheco Creek NF



Site Description:
This non-tidal site is a short section of a tributary to Pacheco Creek that flows between Papermill Creek Ct and Oak Forest Rd amidst residential development.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest, with bays and oaks.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
No RAS model. Following the flooding of two homes in the neighborhood last year, the system (consisting of a creek flowing into a 42" pipe through a series of inlets) was modeled in HY-8. The inlets, when clear of debris, allow a 10-year flow into the pipe which itself has 100-year capacity. In order to minimize flood risk, the creek upstream (within our easement) is cleared of debris and vegetation that may be loosened by high flows. Per CDFW request, District is developing potential CIPs to daylight the creek.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 1 - Novato

Site: **1-RUSH-1, 1-RUSH-2, 1-RUSH-3**
Rush Creek



Rush Creek near Olive Ave on a veg maintenance reach.

Site Description:
This work site includes three separate areas of tidally-influenced Rush Creek:1) tidegates at the downstream end near Cemetery Marsh, 2) sediment and vegetation maintenance at the culvert outlets downstream of Binford Road and 3) vegetation maintenance on a short stretch near Olive Ave between Novato Blvd and Highway 101. The tidegates are in an open salt marsh area.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
USACE jurisdiction.

Vegetation communities:
The site is located in northern coastal salt marsh. The upstream area has cattails and a variety of non-native herbaceous and shrubby species. Downstream Site #2 drains into the marsh and Site #3 is more urbanized.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, northwestern pond turtle, and salt marsh harvest mouse near the downstream tidegate.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; BIRD-1, MAMM-1.

Maintenance Activities:
Vegetation maintenance, sediment removal and tidegate maintenance.

Maintenance Trigger:
No RAS model. Local businesses frequently express concern about this drainage. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows. District is working with local partners (City, Transportation Authority of Marin, Caltrans) to secure funding for a watershed study that leverages the existing stormdrain model completed by the City of Novato and new Countywide LiDAR terrain data. This will refine maintenance triggers in the future.

Flood Control Zone 1 - Novato

Best Management Practices:
A-43; A-67;A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-SIMM**
Simmons Slough


Simmons Pump Station on Simmons Slough.

Site Description:
The work site is at the Simmons Slough pump station (which pumps water from the slough into Novato Ck. The area is tidally-influenced; adjacent land uses include flood control and agriculture. Sediment is removed to promote positive flow to Pump intake from DS HWY 37 to Novato Creek Levee and perpendicular levee screw gate to Sanitary District PS. Very low gradient; water at intake is normal; aggradation blocks conveyance to PS.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Sediment removal may be under USACE jurisdiction.

Vegetation communities:
The vegetation type at the sediment removal site is northern coastal salt marsh with salt grass and pickleweed; the levee tops around the pump station is annual grass- lands, with dominant species comprised mainly of nonnative grasses, wild radish, and bull mallow.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; BIRD-1, MAMM-1.

Maintenance Activities:
Sediment removal and pump station maintenance.

Maintenance Trigger:
Sediment removal as needed to maintain positive drainage to pump station and protect pump operations.

Flood Control Zone 1 - Novato

Best Management Practices:
A-43; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV- 1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4a; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: **1-SMC**
San Marin Creek



San Marin Creek at Leese Ln.

Site Description:
The site is a narrow block-long stretch of creek between Leese Ln and Driftwood Ave well above tidal influence. The area is entirely within a residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest. The dominant trees are oak and bays.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
No floodplain, between houses. Manage for removing flow-diverting obstructions and bank stability. ($n < \sim 0.04$)

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 1 - Novato

Site: **1-SRC**
San Ramon Creek



San Ramon Creek behind shopping center.

Site Description:
The site is a narrow block-long corridor behind the San Ramon shopping center at San Marin Drive and San Ramon Way. The site is well above tidal influence. The land uses are residential and commercial.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest. The dominant tree species are oaks and bays.

Potentially-occurring special-status species:
California red-legged frog.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; AMPH-1.

Maintenance Activities:
Fire fuel reduction and vegetation maintenance.

Maintenance Trigger:
No Model. Headwater tributary. Vegetation managed to keep culvert inlet clear.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 1 - Novato

Site: **1-VIN**
Vineyard Creek


Vineyard Creek at the Sonoma-Marin parcel.

Site Description:
The work site is a non-tidal, narrow riparian corridor constrained on both sides by residential development. The site includes several discontinuous sections of non-tidally influenced riparian corridor.

Adjacent land uses are primarily residential.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest. Tree species include bays, willows, alders. Understory species include wild grape, blue elderberry, Himalayan blackberry, ivy, and native and non-native grasses.

Potentially-occurring special-status species:
Steelhead trout; not present when work is completed during dry season.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, and erosion control.

Maintenance Trigger:
Much of this reach is immediately adjacent to low-lying residential properties. Following flooding in 2006, about 3,000 linear feet of channel (also includes parts of 1-WAR-3) was laid back and/or configured to have a floodplain terrace. Fish passage was improved, and native vegetation was planted in the riparian corridor compatible with the Manning's n values in the HEC-RAS model that was created to support the design (50-year flow capacity). The pictograms (Section 5.2) in the SMP Manual are also show when maintenance needs to occur as this section is complex and hard to have one trigger.

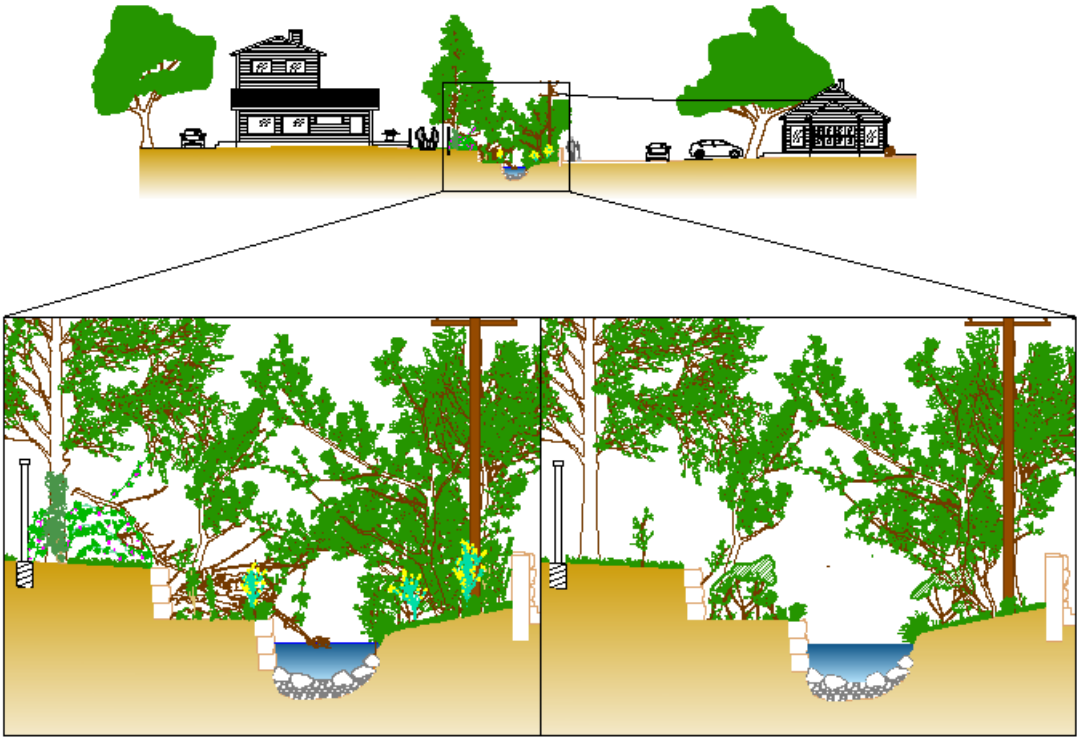
Flood Control Zone 1 - Novato

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Pictogram:

Example of a Modified Engineered Channel
(e.g., 1-VIN Downstream of Center Road Bridge)



Before Annual Maintenance **After Annual Maintenance**

Flood Control Zone 1 - Novato

Site: **1-WAR-1**
Warner Creek



Site Description:
The work site is the tidally-influenced downstream portion of Warner Creek from its confluence with Novato Creek upstream to Diablo Ave. The lower portion, below Novato Blvd, has a concrete-lined right bank; the upstream portion is all natural.

Adjacent land uses include residential and commercial development.

Type of Stream Channel:
Earthen/Concrete, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type east of S. Novato Blvd is northern coastal salt marsh; west of S. Novato Blvd is north coast riparian scrub/forest. The predominant species present are cattails and oaks.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:
Trim branches and emergent vegetation in the active channel. Pluck select cattail roots to maintain a small low flow channel. Stabilize banks as needed.

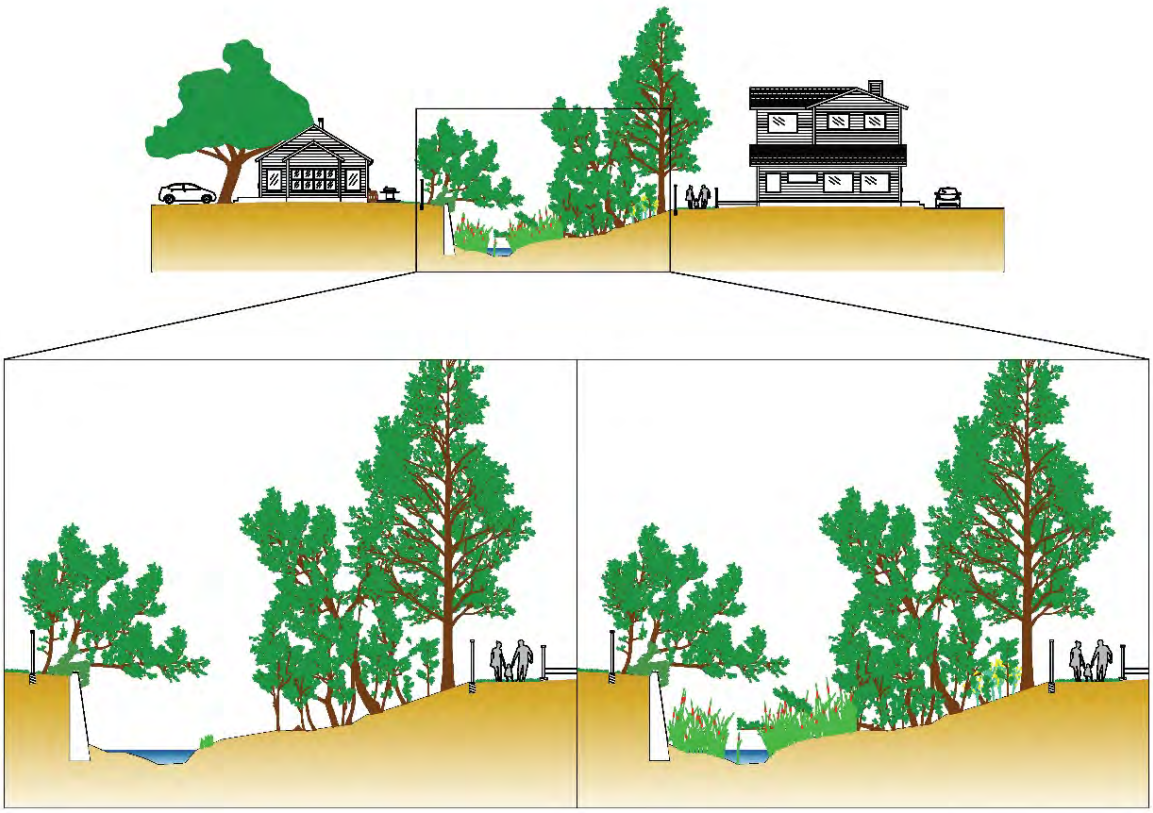
Maintenance Trigger:
Novato Creek hydraulic (RAS) model includes this location. No floodplain available and low-lying homes are adjacent. Constructed for Q50 but ~Q10 service. Manage channel for n < 0.03, margins < 0.04. Updated modeling in 2020 found benefits of sediment removal to be minimal so we are initiating a study of potential alternative projects to protect adjacent communities from recurrent flooding. A low-flow channel less than 2

feet wide triggers need to pluck out cattail roots to allow for passage of fish and sediment through the reach. This should reduce the need for major sediment removal.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Pictogram:

Example of a Modified Engineered Channel
(e.g., confluence of Warner and Novato Creeks [1-WAR-1])



After Annual Maintenance **Before Annual Maintenance**

Site: **1-WAR-2**
Warner Creek

Site Description:
The work site is upstream of tidal reach and extends from Diablo Ave upstream to the confluence with Vineyard Creek.

The riparian corridor is constrained by residential development.

Type of Stream Channel:
Earthen, Engineered



Warner Creek near confluence with Wilson Creek.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest. Portions of the area were re-planted in the 1980's as mitigation with native species including willows, bays, alders, blue elderberry and box elder.

Potentially-occurring special-status species:
Steelhead trout and northwestern pond turtle.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; FISH-1, REP-1.

Maintenance Activities:
Fire fuel reduction; vegetation maintenance; and erosion control.

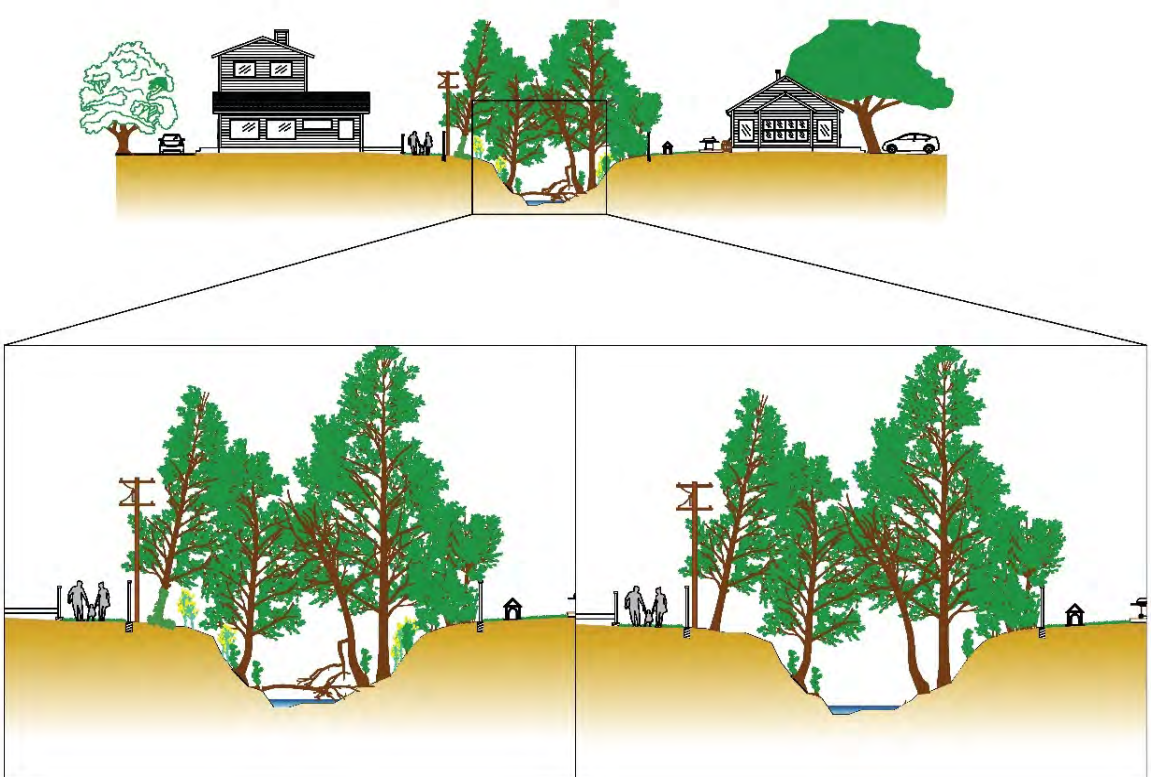
Maintenance Trigger:
Much of this reach is immediately adjacent to low-lying residential properties. Following flooding in 2006, about 3,000 linear feet of channel (also includes parts of 1-VIN) was laid back and/or configured to have a floodplain terrace. Fish passage was improved, and native vegetation was planted in the riparian corridor compatible with the Manning's N values in the HEC-RAS model that was created to support the design (50-year flow capacity). The remainder of this reach was part of the Novato Creek Flood Control Project Phases IV through VII, which was built in response to extensive flooding in 1982, also with a goal of providing 50-year flow capacity. The pictograms (Section 5.2) in the SMP Manual are also show when maintenance needs to occur as this section is complex and hard to have one trigger.

Flood Control Zone 1 - Novato

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Pictogram:

Example of a Natural Channel
(e.g., Novato Creek downstream of Novato Boulevard [1-NOV-3] and 1-WAR-2)



Before Annual Maintenance **After Annual Maintenance**

Flood Control Zone 1 - Novato

Site: **1-WIL**
Wilson Creek



Wilson Creek at Jennifer Ln.

Site Description:
The work site consists of four discontinuous, non-tidal sections of Wilson Creek, extending from the confluence with Warner Creek to near the intersection of Wilson Ave and Hatch Rd. The riparian corridor is constrained by residential development on both sides.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest, with willows dominating.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, and erosion control.

Maintenance Trigger:
Lower half-mile is included in Novato Creek hydraulic model. Manning's n values are 0.035 for channel and 0.08 over bank. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed so they are unlikely to block flows in this residential reach.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-ACMP-1**
Arroyo Corte Madera del Presidio



Site Description:
This site is tidally influenced and extends from La Goma St to just downstream of the Camino Alto crossing.

The predominant land use is residential and commercial.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh in the downstream section; above the Reed Creek confluence, north coast riparian scrub/forest dominates with oaks, bays, and willows.

Potentially-occurring special-status species:
Point Reyes bird's beak and steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Minimal Floodplain available. Model floodplain Mannings n = 0.1, Manage for channel n value < 0.03.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: **3-ACMP-2**
Arroyo Corte Madera del Presidio



Site Description:
This site is above the extent of tidal influence and extends from the confluence of Old Mill Creek downstream to the confluence with Warner Creek.

The predominant land use is residential and commercial.

Type of Stream Channel:
Modified Earthen Channel.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest, with dominant tree species present being acacia, willows, hazel, alder and box elder.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Minimal Floodplain available. Model floodplain Mannings n = 0.1, manage for channel n value < 0.03.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: **3-ACMP-3**
Arroyo Corte Madera del Presidio



Site Description:
This site is a narrow riparian corridor that extends from 650 W. Blithedale Ave. downstream to the Sunnyside crossing. It is well above tidal influence.

The predominant land use is residential and commercial.

Type of Stream Channel:
Modified Earthen Channel.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest. Acacia, willows, alder, and box elder make up the majority of tree species in the riparian corridor.

Potentially-occurring special-status species:
Marsh microseris and steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; PLA-1, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Minimal Floodplain available. Model floodplain Mannings n = 0.1, manage for channel n value < 0.03.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: **3-BM**
Bothin Marsh



Site Description:
The site is a tidally influenced drainage ditch from Sutton Manor upstream to E. Blithedale Ave, between Roque Moraes Dr. and the Marin County Multi-Use Path.

Adjacent land use is residential and commercial.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
Point Reyes bird's beak, California black rail and California Ridgway's rail.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, BIRD-1.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Sutton Manor outfall into marsh. Debris removed to prevent culvert obstruction and backwatering.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-CAS**
Cascade Creek



Site Description:
The site extends from the confluence with Old Mill Creek (at Cascade Dr.) approximately 600 ft upstream. The site is well above tidal influence.

Surrounding land use is low-density residential and municipal open space.

Type of Stream Channel:
Natural.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Marsh microseris and steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Removal of major flow-diverting obstructions only.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: **3-COY-1**
Coyote Creek



Site Description:
The site is tidal with natural bottom and extends from Shoreline Hwy upstream to the start of the concrete channel.

Surrounding land use includes residential and commercial.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, BIRD-1; MAMM-1.

Maintenance Activities:
Erosion control, pump station, tidegate, and levee maintenance.

Maintenance Trigger:
The HEC-RAS model for this creek is updated periodically. Most recent modeling shows that removing sediment would increase the freeboard to USACE standards, but this is not justified by the high cost of construction given flooding of structures would not be impacted.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-COY-2**
Coyote Creek



Site Description:
The site is tidal with concrete channel and extends from the start of the concrete bottom upstream to Laurel Way.

Surrounding land use is residential and commercial.

Type of Stream Channel:
Concrete, Engineered.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The channel bottom is concrete; predominant vegetation type on the banks is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance, sediment removal, erosion control, and tidegate maintenance.

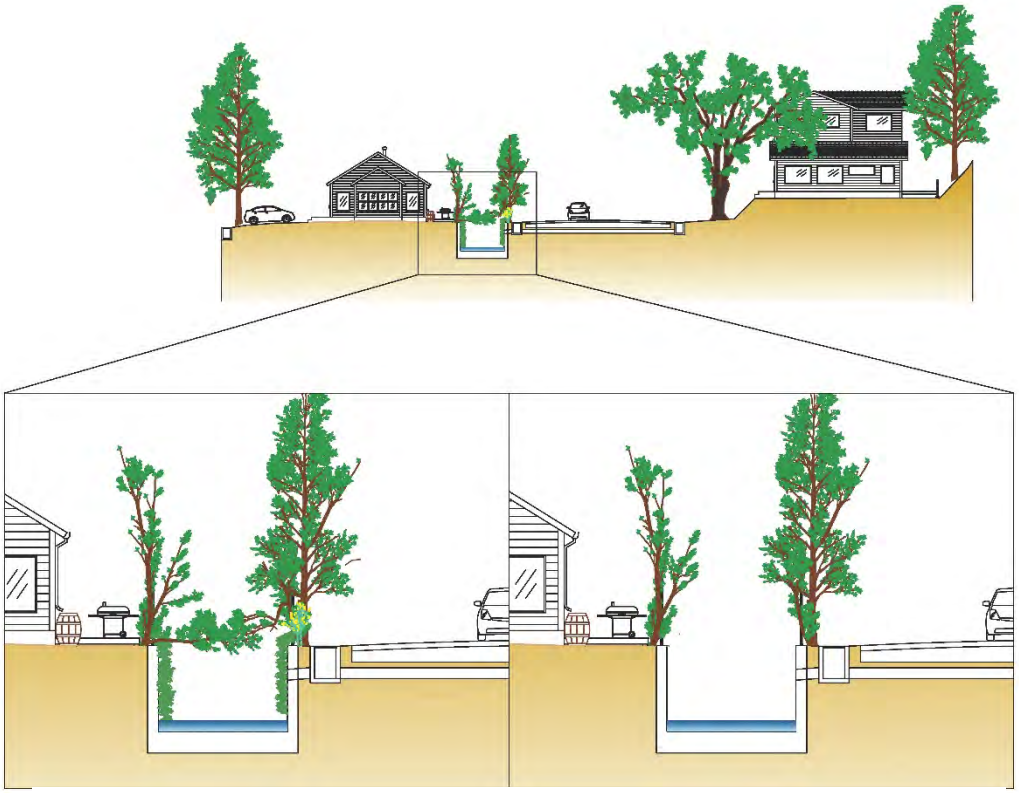
Maintenance Trigger:
When updated surveying and HEC-RAS modeling for this creek indicates creek overtopping during the USACE 20-year design event sediment removal is triggered.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Pictogram:

Example of a Concrete Engineered Channel
(e.g., Coyote Creek confluence [3-COY-2 and 3-COY-3])



Before Annual Maintenance **After Annual Maintenance**

Flood Control Zone 3 - Richardson Bay

Site: **3-COY-3**
Coyote Creek



Site Description:
The site consists of a non-tidal, concrete channel. It extends from Laurel Way upstream to Ash St.

Surrounding land use is residential and commercial.

Type of Stream Channel:
Concrete, Engineered.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The dominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance, sediment removal, erosion control, and tidegate maintenance.

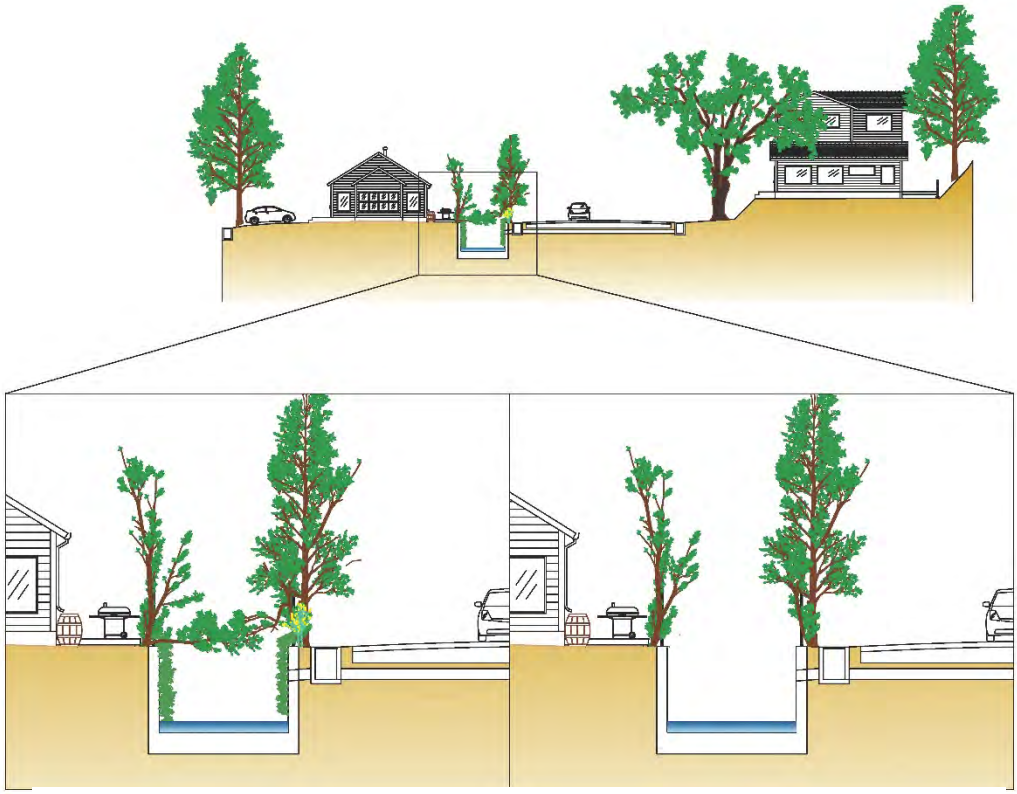
Maintenance Trigger:
When updated surveying and HEC-RAS modeling for this creek indicates creek overtopping during the USACE 20-year design event sediment removal is triggered.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-2; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Pictogram:

Example of a Concrete Engineered Channel
(e.g., Coyote Creek confluence [3-COY-2 and 3-COY-3])



Before Annual Maintenance **After Annual Maintenance**

Flood Control Zone 3 - Richardson Bay

Site: **3-COY-4**
Coyote Creek



Site Description:
The site is non-tidal and includes the reaches between Ash St. and Maple Ave.

Surrounding land use is residential and commercial.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
When updated surveying and HEC-RAS modeling for this creek indicates creek overtopping during the USACE 20-year design event sediment removal is triggered.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-COY-5**
Coyote Creek



Site Description:
The site is non-tidal and has a natural bottom. The site extends for approximately 300 ft, generally parallel to Marin Ave along the south fork.

Surrounding land use is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
When updated surveying and HEC-RAS modeling for this creek indicates creek overtopping during the USACE 20-year design event sediment removal is triggered.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-CRE-1**
Crest Marin Creek



Site Description:
This site is non-tidal and extends from Flamingo Rd to Ross Dr.

The predominant land use is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is California annual grassland.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

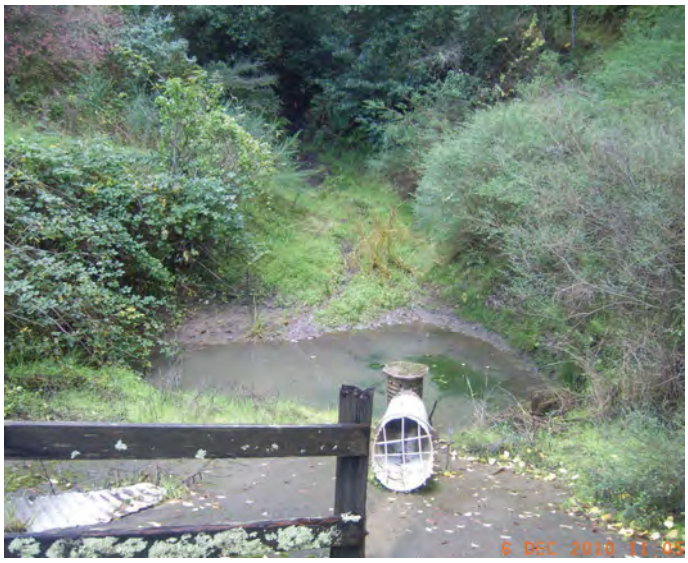
Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, and pump station and tidegate maintenance.

Maintenance Trigger:
When there is significant build-up of sediment that it is observed during the winter that it doesn't effectively reach the pump station, sediment removal is triggered to protect the neighborhood.

Best Management Practices:
A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-CRE-2**
Crest Marin Creek



Site Description:
The site extends from just below the driveway crossing upstream approximately 225 ft. and includes the Laurel Way silt basin. The site is well above tidal influence.

Surrounding land use is residential.

Type of Stream Channel:
Earthen/Concrete, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation types are north coast riparian scrub/forest and mixed evergreen forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Sediment is removed when it has filled the sediment basin to the point that drainage facilities are beginning to become buried, which threatens to undermine flood control management in this neighborhood.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-MIL-1**
Miller Ave



Site Description:
This site is located just south of the Miller Ave/Camino Alto intersection. It is tidally influenced.

Surrounded land use is residential and commercial.

Type of Stream Channel:
Earthen/Concrete, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The dominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, BIRD-1; MAMM-1.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
With the 2017 repair of the tide gate at the downstream end it is anticipated that sediment removal will not be triggered as long as it remains in working condition.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-MIL-2**
Miller Ave



Site Description:
This site is tidal and is located across from Tamalpais High School, just east of 625 Miller Ave.

The surrounding land use is residential and commercial.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The dominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, BIRD-1; MAMM-1.

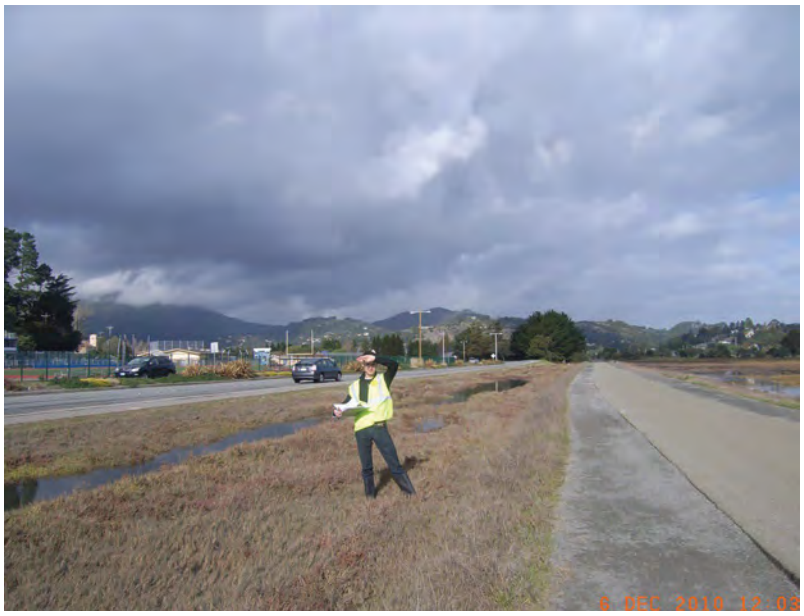
Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Maintain design cross section of roadside ditch.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-MIL-3**
Miller Ave



Site Description:
This site is located across from the track at Tamalpais High School. It is tidally influenced.

The surrounding land use is residential and commercial.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
Point Reyes bird's beak, California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, BIRD-1; MAMM-1.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Maintain design cross section of roadside ditch.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-MRN**
Marin City



Site Description:
The site is non-tidal. The south trash rack is located off Pacheco St.; the northern trash rack is located at the end of Dutton Ct.

Surrounding land use is residential and commercial.

Type of Stream Channel:
Concrete Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
At the northern trash rack, the vegetation type is north coast riparian scrub/forest; at the southern trash rack, the vegetation community is California annual grassland.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Debris removal.

Maintenance Trigger:
Any debris on the trash racks is removed to prevent flooding of structures in the vicinity.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-NYH-1**
Nyhan Creek



Site Description:
The site is non-tidal and extends upstream from Enterprise Concourse to Headlands Ave.

Surrounding land use is low-density residential and institutional.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, and erosion control.

Maintenance Trigger:
The Enterprise Concourse bridge is a hydraulic restriction, and any accumulation of sediment beneath and in the vicinity could increase the risk of flooding.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-NYH-2**
Nyhan Creek



Site Description:
This site is a non-tidal channel behind Tamalpais Valley Elementary School.

Surrounding land use is residential and institutional.

Type of Stream Channel:
Concrete, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance and sediment removal.

Maintenance Trigger:
When there is significant build-up of sediment in the concrete ditch it needs to be removed in order to reduce the risk of flooding at the school and/or Tennessee Valley Road. High water marks are evaluated in the spring and if the prior winter nearly overtopped the ditch and sediment has accumulated it is considered significant.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-NYH-3**
Nyhan Creek



Site Description:
This site is a non-tidal channel, approximately 465 ft long, next to the Tamalpais Valley Community Center.

Surrounding land use is residential and institutional.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance.

Maintenance Trigger:
No Hydraulic Model. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows in this reach with adjacent residences and businesses.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: **3-OMC**
Old Mill Creek



Site Description:
The site is a riparian corridor extending from Ethel Ave crossing upstream to 550 Cascade Dr. The site is well above tidal influence.

The predominant land use is residential.

Type of Stream Channel:
Natural.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest. Redwood, dogwood, ferns, ivy, and vinca are the dominant species present.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Hydraulics modeled as part of Arroyo Corte Madera Del Presidio. Manage for Manning's $n < 0.035$ in channel (low roughness) over bank modeled as $n = 0.1$ (very dense brush).

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: **3-REED-1**
Reed Creek



Site Description:
The site is a tidally influenced open ditch about a block long from the confluence with Arroyo Corte Madera del Presidio to Miller Ave.

The surrounding land use is commercial.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction. No coffer dam needed if done at low tide.

Vegetation communities:
The vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
Steelhead trout possibly during high tide only.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
No Hydraulic Model. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows in this reach with adjacent residences and businesses.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-RSD**
Robin-Starling Ditch



Site Description:
The site is a non-tidal ditch, approximately 535 ft long, running from just upstream of the Robin Rd crossing and Coyote Creek.

The surrounding land use is residential development.

Type of Stream Channel:
Modified Earthen Channel.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is California annual grassland.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction.

Maintenance Trigger:
No Hydraulic Model. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows in this reach with adjacent residences and businesses.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: **3-RYC-1**
Ryan Creek



Site Description:
The site is non-tidal and extends from the confluence with Sutton Manor approximately 300 ft to just upstream of the Camino Alto crossing.

Adjacent land uses include institutional, open city-owned parcels, and utilities.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is diked baylands. The area is disturbed, with nonnative grasses, grindelia, and pickleweed present.

Potentially-occurring special-status species:
Point Reyes bird's beak.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:
Sediment removal, vegetation maintenance, and pump station and tidegate maintenance.

Maintenance Trigger:
Ryan Creek RAS model. Manage for channel Mannings n < 0.045, margins 0.1.

Best Management Practices:
A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-RYC-2**
Ryan Creek



Site Description:
The site is a block-long stretch of non-tidal creek from Nelson Ave upstream to Amicita Ave; it passes through the yards of residential lots.

The land use is residential.

Type of Stream Channel:
Modified Earthen Channel.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Ryan Creek RAS model. Manage for channel Mannings n < 0.045, margins 0.1.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: **3-SEM**
Seminary PS



Site Description:
The site is tidally influenced and is located behind the Shell gas station on Da Silva Island Dr.

Adjacent land uses are commercial and residential (DSI Homeowners Association owns the surrounding open areas).

Type of Stream Channel:
N/A – below ground pump station.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The pump station location sits at the junction of commercial land use, mixed evergreen forest, and northern coastal salt marsh.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6. BIRD-1, MAMM-1.

Maintenance Activities:
Pump station and tidegate maintenance.

Best Management Practices:
A-229; A-103; A-107; EV-1; EV-2; NR-1; NR-3; VR-4a; VR-4b; VR-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-SUT-1**
Sutton Manor



Site Description:
The site is a tidally influenced section of Sutton Manor upstream to E. Blithedale Ave, between Roque Moraes Dr and the Marin County Multi-Use Path.

Adjacent land use is residential and commercial.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
Point Reyes bird's beak, California black rail and California Ridgway's rail.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, BIRD-1.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-SUT-2**
Sutton Manor



Site Description:
The site extends from Roque Moraes Dr to Ashford Ave and is tidally influenced. The stream corridor is tightly constrained be- tween E. Blithedale Ave and parking lots.

The adjacent land use includes commercial and residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The vegetation type is northern coastal salt marsh, with blackberry and nonnative grasses the predominant species present.

Potentially-occurring special-status species:
Point Reyes bird's beak.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-SUT-3**
Sutton Manor



Site Description:
The site extends about a block from Ashford Ave upstream to the extent of tidal influence. This section of Sutton Manor is concrete-lined.

Adjacent land use is residential.

Type of Stream Channel:
Concrete, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The vegetation type on the banks is California annual grassland, with predominantly nonnative species present.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-SUT-4**
Sutton Manor



Site Description:
The site extends from about Dorset Ln to the T intersection with Shell Rd ditch. This section of Sutton Manor is non-tidal and concrete-lined, and it flows through residential backyards.

The nearby land use is residential.

Type of Stream Channel:
Concrete, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type on the banks is California annual grassland, with predominantly nonnative species present.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-SUT-5**
Sutton Manor



Site Description:
The site encompasses non-tidal Shell Rd ditch, between Meadow Rd and Shell Rd. The ditch is mostly concrete-lined, turning to natural bottom at the upstream portion near Lomita Dr.

Adjacent land use is residential.

Type of Stream Channel:
Earthen/Concrete, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is California annual grassland, with predominantly nonnative species present.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-SUT-6**
Sutton Manor



Site Description:
The site is located at the Vasco Ct crossing of Sutton Manor. The site is well above tidal influence.

Surrounding land uses are residential and institutional.

Type of Stream Channel:
Concrete, Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is California annual grassland, with predominantly nonnative species present.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Debris removal.

Maintenance Trigger:
Drainage ditches, unmodeled, no floodplain, manage for n < 0.04.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: **3-WAR**
Warner Canyon Creek



Site Description:
The site is a non-tidal, riparian corridor that extends from just downstream of the E. Blithedale crossing to just up-stream of Vista Linda Dr.

The predominant land uses are residential and commercial.

Type of Stream Channel:
Natural.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation present is north coast riparian scrub/forest; dominant species are oaks, ferns, ivy, broom, coyote brush and dogwood.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
High gradient, unmodeled.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: **4-EAST-1**
East Creek



Site Description:
This site is a narrow corridor about a block long and is tidally influenced.

Surrounding land uses are residential and commercial.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
Point Reyes bird's beak, California black rail and California Ridgway's rail.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, BIRD-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, and pump station maintenance.

Maintenance Trigger:
Hydraulic RAS model exists. Manage for Mannings n < 0.02 in the most constrained sections. No floodplain available.

Best Management Practices:
A-67; A-69; A-73; A-103; A-107; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4; VR-4a; VR-4b; VR-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: **4-EAST-2**
East Creek



Site Description:
This site is a non-tidal, narrow corridor between residential subdivisions, generally running behind Leland Way and Karen Way.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is annual grassland behind Leland Way and north coast riparian scrub/forest behind Karen Way.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, and sediment removal.

Maintenance Trigger:
Hydraulic RAS model exists, prone to flooding from 10-year event. Manage for Mannings n < 0.02 in the most constrained sections. No floodplain available.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: **4-STR**
Strawberry Circle



Site Description:
This site is tidally influenced and is located on Mill Valley school property off Strawberry Dr.

The predominant land use is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
Point Reyes bird's beak, California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, BIRD-1, MAMM-1.

Maintenance Activities:
Fire fuel reduction, sediment removal, erosion control, and pump station, tidegate, and levee maintenance.

Maintenance Trigger:
No model exists. The ditch is flat and can only drain at high tide. It is important for the adjacent homes that the tide gate function as they are lower than very high tides. Vegetation must be maintained on the levee to allow regular access to inspect the tide gate and any objects should be removed from the ditch, so they don't get stuck in the tide gate.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: **4-WEST-1**
West Creek



Site Description:
This site extends from upstream of Highway 131/Tiburon Blvd to the extent of tidal influence and runs behind houses in the residential subdivision.

The predominant land use is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
Point Reyes bird's beak.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, and pump station and tidegate maintenance.

Maintenance Trigger:
HEC-RAS model exists. The active channel roughness coefficient used was 0.035. An overbank roughness coefficient of 0.09 was used for densely vegetated and overbank areas. Maintain this state. Remove sediment from downstream of Cecilia Way bridge when freeboard under bridge is less than 3 feet (as modeled).

Best Management Practices:
A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: **4-WEST-2**
West Creek



Site Description:
The site is above the extent of tidal influence and is a narrow riparian corridor running between residential backyards.

The predominant land use is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest. Many native species have been planted as mitigation, including spicebush, blue elderberry, and redwood trees.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
HEC-RAS model exists, and area is prone to flooding from 10-25 year events. The active channel roughness coefficient used was 0.035. An overbank roughness coefficient of 0.09 was used for densely vegetated and overbank areas. Maintain this state.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 5 - Stinson Beach

Site: **5-EAS-1 (a-e)**
Easkoot Creek



Site Description:
The site is tidally-influenced and generally parallels Highway 1 between Calle del Ribera and Calle de Pinos.

Surrounding land use is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
Even though there is tidal influence, the dominant vegetation type is north coast riparian scrub/forest, with dominant tree species include bays, buckeyes, willows and a few alders. Shrubs include Himalayan blackberry, cape ivy, broom and pampas grass.

Potentially-occurring special-status species:
Point Reyes bird's beak, coho salmon and steelhead trout, California red-legged frog, and monarch butterfly.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1, INV-1, AMPH-1.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Manage for Mannings n < 0.04, no floodplain available until ds of Calle del Arroyo clear floodplain to n < 0.08 medium brush.

Best Management Practices:
EC-1, EC-2, EC-4, EC-12, SC-21, SC-34, WM-3, A-67, A-69, A-73, A-229.

Flood Control Zone 5 - Stinson Beach

Site: **5-EAS-2**
Easkoot Creek



Site Description:
The site is a n off-channel sediment basin which is non-tidal. The site is adjacent to a parking lot on National Park Service land, behind the Parkside Cafe.

Surrounding land use is recreational and commercial.

Type of Stream Channel:
Earthen, Modified**.**

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction???

Vegetation communities:
The dominant vegetation type is north coast riparian scrub/forest, with dominant tree species include bays, buckeyes, willows and a few alders. Shrubs include Himalayan blackberry, cape ivy, broom and pampas grass.

Potentially-occurring special-status species:
Point Reyes bird's beak, coho salmon and steelhead trout, California red-legged frog, and monarch butterfly.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1, INV-1, AMPH-1.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Manage for Mannings n < 0.04, no floodplain available.

Best Management Practices:
EC-1, EC-7, EC-12, SE-1, SE-2, SE-3, SE8, SE-9, SC-21, SC-34, TC-1, WE-1, A-53, A-61, A-63, A-71, A-101, A-103, A-107, A-109, A-113, A-117, A-141, A-229**.**

Flood Control Zone 5 - Stinson Beach

Site: **5-EAS-3**
Easkoot Creek



Site Description:
The site is a non-tidal, riparian corridor that extends upstream of 5-EAS-2 up to the Stinson Beach Community Center.

Adjacent land uses are residential and commercial.

Type of Stream Channel:
Earthen, Modified**.**

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest, with bays and buckeyes the predominant overstory; shrubs include Himalayan blackberry, cape ivy, and French broom.

Potentially-occurring special-status species:
Point Reyes bird's beak, coho salmon and steelhead trout, California red-legged frog, and monarch butterfly.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1, AMPH-1, and INV-1.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Manage for Mannings n < 0.04, no floodplain available.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-CAS**
Castro Ditch



Site Description:
This site consists of a non-tidal concrete v-ditch within a 10-ft wide easement running between backyards and around Castro Park in a residential neighborhood.

Type of Stream Channel:
Earthen Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is California annual grassland; there are some back-yard trees that overhang the ditch.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance and sediment removal.

Maintenance Trigger:
Plants and debris in the ditch, that have potential to increase capture of additional debris or sediment, are being trimmed so they are unlikely to block flows in this reach and cause flooding to adjacent residences. Residents express frequent concerns about drainage here.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-EST**
Estancia Ditch



Estancia Ditch (Gallinas Creek is below levee on right)

Site Description:
Estancia Ditch is non-tidal and runs between Gallinas Creek levees and residential development.

Type of Stream Channel:
Earthen Engineered.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is diked baylands, dominated by non-native species such as European grasses, Bermuda grass, fennel, and English plantain. Because the ditch has a very slow summer inflow from tidal infiltration, there is standing brackish water with pickleweed, saltgrass, and cordgrass.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, BIRD-1, MAMM-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, erosion control, and pump station, tidegate, and levee maintenance.

Maintenance Trigger:
There is a HEC-RAS model for this ditch. There ditch is extremely flat and there is not a consistent positive slope to the pump station. Obstructions are removed, but portable pumps are still needed.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-GAL**
Gallinas Creek SF



Gallinas Creek levee

Site Description:
The site is atop the Gallinas Creek levees from Pump Station 5 west around Santa Margarita Island.

Gallinas Creek fronts one side of the levee; the other side is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type on the levee tops is California annual grassland. There are northern coastal salt marsh communities on the creek side of the levee, but no work is done in those areas.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, and salt marsh harvest mouse could potentially inhabit the salt marsh areas (but are unlikely to be affected by levee-top work).

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, BIRD-1, MAMM-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, erosion control, levee maintenance and pump station maintenance.

Maintenance Trigger:
Vegetation management is not conducted within the channel here. Sediment removal is not needed for flood control based on a 2014 study, but any navigational dredging would be permitted under a project specific permit for the Gallinas Creek Geomorphic Dredge Project (CSA 6).

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-

229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-LAP-1**
La Pasada outfall



Site Description:
This site is a stormwater outfall to Gallinas Creek. This is the down-stream end of the La Pasada Interceptor, and the pipe goes through the Las Gallinas levee and outfalls into Gallinas Creek.

Work at the outfall requires access through the marsh vegetation.

Type of Stream Channel:
Earthen Engineered.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh; pickleweed, saltgrass and cordgrass are present.

Potentially-occurring special-status species:
Point Reyes bird's beak, California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, BIRD-1, MAMM-1.

Maintenance Activities:
Sediment removal and tidegate maintenance.

Maintenance Trigger:
Sediment would be removed here if it rendered the rubber check valve at the end of this pipe inoperable. In 2014 a project to slip-line the storm drain pipe and extend it out to the deeper and more geomorphically stable section of the creek appears to have been effective thus far in preventing the need for sediment maintenance here.

Best Management Practices:
A-43; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV- 1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4a; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-LAP-2**
La Pasada inlet



La Pasada inlet and ditch along N San Pedro Road.

Site Description:
This site is a stormwater inlet on the side of North San Pedro Rd, just down- hill from a slope forested with oaks and bays. The site is non-tidal.

Type of Stream Channel:
Earthen Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is California annual grassland. Nonnative grasses dominate at the inlet itself.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
This is the responsibility of Road Maintenance, not the District, and is conducted within the road with a vactor truck each fall and as needed.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD- 5.

Flood Control Zone 7 - Santa Venetia

Site: **7-MAB**
Mabry Ditch



Site Description:
The site is a 15-ft wide ditch running between backyards in a residential neighborhood.

Type of Stream Channel:
Earthen Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is California annual grassland. The predominant species are nonnative grasses; landscape trees from backyards shade the ditch in some areas.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, and erosion control.

Maintenance Trigger:
No model. Relatively flat. Very little space between ditch and adjacent homes. Maintain positive drainage to either end (splits ~midway).

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-MCPH**
Berm at Sunny Oaks



Site Description:
The site is located on the west side of the grounds of McPhail School, on N. San Pedro Rd.

Type of Stream Channel:
Earthen Berm.

Wetlands and other Waters, including Waters of the State:

Vegetation communities:
The predominant vegetation type is California annual grassland, with nonnative species dominating.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 7 - Santa Venetia

Site: **7-MEA-1**
Meadow Way outfall



Meadow Way outlet maintenance (2010).

Site Description:
The tidally-influenced site is the outfall of a stormwater pipe; the pipe goes through the Gallinas Creek levee and outfalls into the creek.

Type of Stream Channel:
Earthen Engineered.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The dominant vegetation is northern coastal salt marsh; the area is tidally influenced but there is not much pickleweed habitat. Upslope areas are dominated by nonnative grasses.

Potentially-occurring special-status species:
Point Reyes bird's beak, California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, BIRD-1, MAMM-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, and pump station and tidegate maintenance.

Maintenance Trigger:
Sediment removal here in 2010 was conducted, but it immediately returned to an equilibrium condition more than half full. This is due to high sediment levels in the creek. When the Gallinas Creek Geomorphic Dredge Project (not a District project) is completed, removal of sediment here should be conducted in conjunction.

Best Management Practices:
A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-MEA-2**
Meadow Way inlet



Trash rack at Meadow Way inlet, near the 7-11.

Site Description:
The site consists of several discontinuous areas on and near Meadow Creek and its tributaries near N. San Pedro Rd and Oxford Dr. The site is above tidal influence.

Surrounding land use is residential and commercial.

Type of Stream Channel:
Earthen Engineered.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The dominant vegetation is north coast riparian scrub/forest with mostly oaks present.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
This is a site where the creek flows through a trash rack into an underground drain that bypasses the community directly adjacent to Gallinas Creek. When the trash rack becomes clogged with debris, it has caused flooding on North San Pedro Road, a critical access road to and from this community. In order to minimize this risk, the area within our easement is cleared of debris and vegetation that may be loosened by high flows.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-SRAL**
S Rafael Airport levee



San Rafael Airport levee with Gallinas Creek on left.

Site Description:
This site is a levee separating the air- port from Gallinas Creek. All of the activities take place on the tops of the levees, not in the creek and marsh.

Type of Stream Channel:
Earthen and timber reinforced berm.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is California annual grassland.

Potentially-occurring special-status species:
California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, BIRD-1, MAMM-1.

Maintenance Activities:
Fire fuel reduction, erosion control, and levee maintenance.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-SOD**
Sunny Oaks drain


Sunny Oaks drainage.

Site Description:
The site is non-tidal (behind levees) and is located at the northwest intersection of N. San Pedro Rd and E Vendola Dr.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The dominant vegetation type is California annual grasslands; dominant species are nonnative herbaceous species.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction and sediment removal.

Maintenance Trigger:
This is a roadside ditch that drains to a large storm drain that outfall in Santa Venetia Marsh through a flap gate. When the channel is choked with cattails and sediment has accumulated in the roots its removal is triggered. This prevents flooding of low-lying homes and preserves passage on N. San Pedro Rd.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-PS-1**
Vendola Dr PS



Pump station #2 between Vendola Dr and the Gallinas levee.

Site Description:
The sites are Pump Stations #1,2,3, and 5 and immediate surroundings, which lie inside the levee and three portable pumps located at 866 and 882 Estancia Way and at 60 Meadow Way.

Type of Stream Channel:
No channel.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The site is California annual grassland; the dominant species are nonnative grasses.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction and pump station maintenance.

Maintenance Trigger:
Wet wells are cleaned annually if there is sediment accumulated.

Best Management Practices:
A-67; A-69; A-73; A-103; A-107; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4; VR-4a; VR-4b; VR-5.

Flood Control Zone 7 - Santa Venetia

Site: **7-PS-2**
PS4 detention basin



Detention basin at Pump Station #4.

Site Description:
The site is a non-tidal, open area behind levees near Pump Station #4

Adjacent land use is residential.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is annual grassland/diked baylands; the dominant species are nonnative grasses.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Fire fuel reduction, sediment removal, and pump station and tidegate maintenance.

Maintenance Trigger:
2014 PCSWMM model of the entire Santa Venetia drainage system indicated the Pump Station 4 watershed has at least 14 homes likely to have flooded living spaces in a 10-year storm. Keeping the engineered earthen basin at the inlet of the pump station clear of vegetation is needed to keep the flood risk at a minimum.

Best Management Practices:
A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-BOTH**
Bothin Creek



Site Description:
This site is a riparian corridor amidst residential development. Bothin Creek is well above the tidal zone.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is mixed evergreen forest, with a redwood overstory and English ivy understory.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Small unmodeled tributary between and under houses. No floodplain. Manage to prevent obstructions.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 – Ross Valley

Site: **9-CCT**
College Ct Outfall



Site Description:
The site extends between residential lots at 10 and 14 College Ct in Larkspur.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Not exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Manage to retain a low flow channel and removing major obstructions.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD- 5.

Flood Control Zone 9 – Ross Valley

Site: **9-CMC-1**
Corte Madera Creek



Site Description:
This site is tidal and is located between the Bon Air Bridge and the end of the natural channel.

The predominant land use is suburban development.

Type of Stream Channel:
Concrete, Engineered.

Wetlands and other Waters, including Waters of the State:
USACE jurisdiction– tidal.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh, with pickleweed and salt grass.

Potentially-occurring special-status species:
Marin knotweed, Point Reyes bird's beak, steelhead trout, California black rail, California Ridgway's rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1, BIRD-1, and MAMM-1.

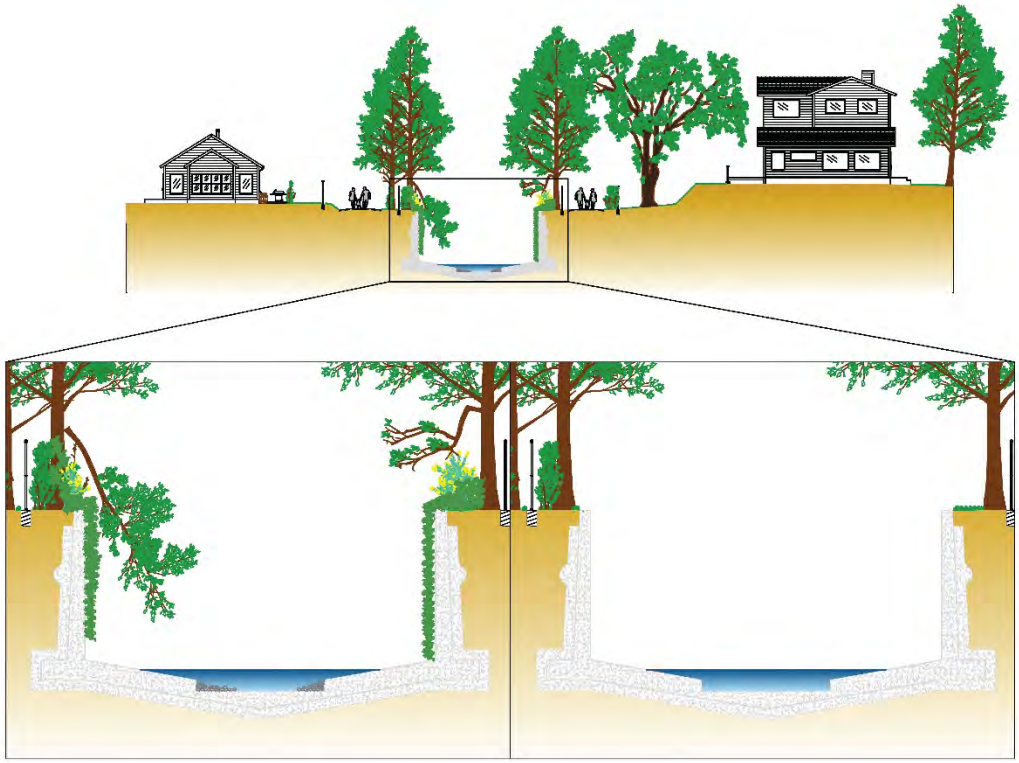
Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal, erosion control, and tidegate and levee maintenance.

Maintenance Trigger:
Due to the benefit not outweighing the cost, a study was conducted on the feasibility of conducting a geomorphic dredge there. It still did not outweigh the cost, so it was recommended not to remove sediment in this reach at this time.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67;A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-2; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5.

Pictogram:

Example of a Concrete Engineered Channel
(e.g., 9-CMC-1 and 9-CMC-2)



Before Annual Maintenance **After Annual Maintenance**

Flood Control Zone 9 – Ross Valley

Site: **9-CMC-2**
Corte Madera Creek



Site Description:
This site is tidal and includes the concrete channel up to the extent of tidal influence.

The predominant land use is suburban development.

Type of Stream Channel:
Concrete, Engineered.

Wetlands and other Waters, including Waters of the State:
Subject to USACE jurisdiction.

Vegetation communities:
The channel is concrete; the predominant vegetation type on the creek banks is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

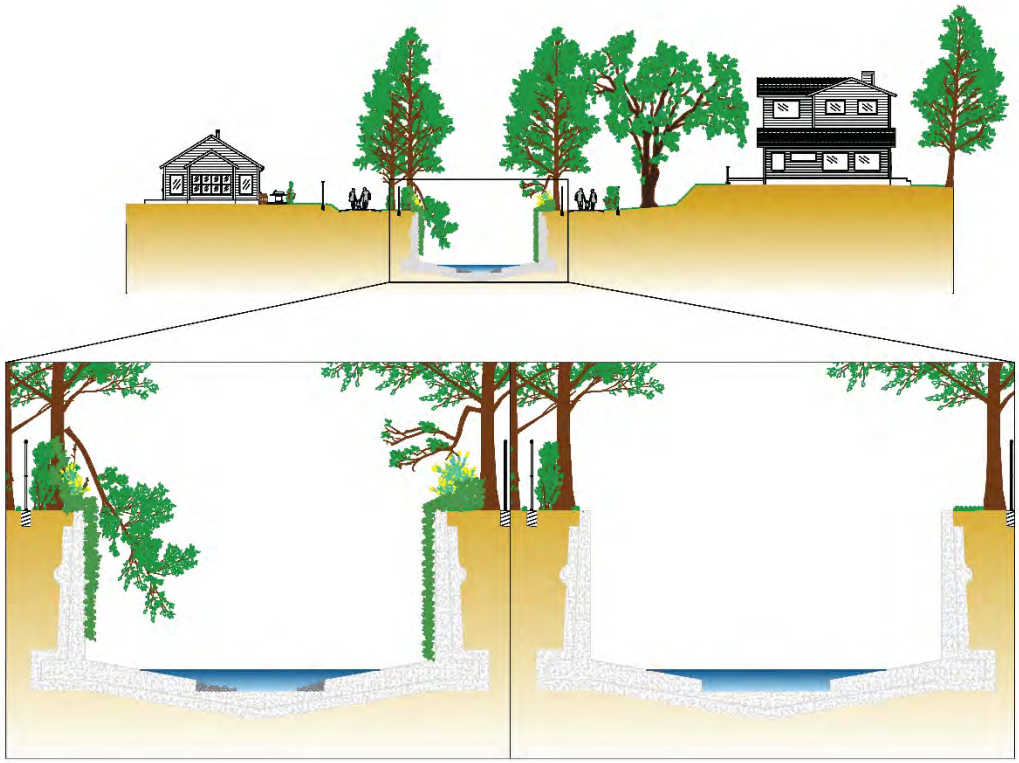
Maintenance Activities:
Vegetation maintenance, sediment removal, erosion control, and tidegate maintenance.

Maintenance Trigger:
Due to the benefit not outweighing the cost, a study was conducted on the feasibility of conducting a geomorphic dredge there. It still did not outweigh the cost, so it was recommended not to remove sediment in this reach at this time.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Pictogram:

Example of a Concrete Engineered Channel (e.g., 9-CMC-1 and 9-CMC-2)



Before Annual Maintenance **After Annual Maintenance**

Flood Control Zone 9 – Ross Valley

Site: **9-CMC-3**
Corte Madera Creek



Site Description:
This site is non-tidal extends from Kentfield Rehab US to Lagunitas Rd Bridge; sediment removal in concrete channel at the fish resting pools only, sediment removal 100 ft. downstream from Lagunitas Bridge.

The predominant land use is suburban development.

Type of Stream Channel:
Earthen, Engineered.

Wetlands and other Waters, including Waters of the State:
USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

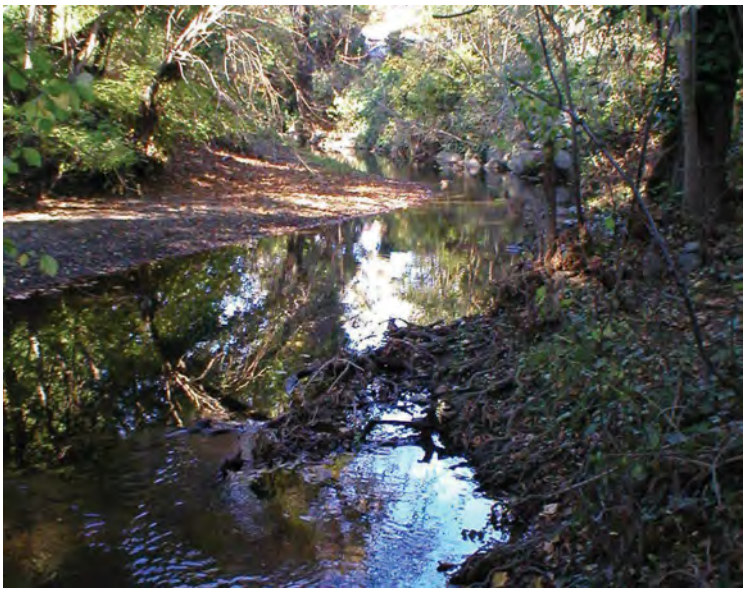
Maintenance Activities:
Vegetation maintenance, sediment removal, erosion control, and tidegate maintenance.

Maintenance Trigger:
Resting pools are cleared of sediment when no longer usable to fish.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-CMC-4**
Corte Madera Creek



Site Description:
This site is the non-tidal reach located between the confluence with Ross Creek and the Lagunitas Rd Bridge in Ross.

The predominant land use is sub-urban development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Fire fuel reduction, vegetation maintenance, sediment removal and erosion control.

Maintenance Trigger:
Manage to retain a low flow channel and removing major obstructions.

Best Management Practices:
A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-FAIR**
Fairfax Creek



Site Description:
This site includes Fairfax Creek from Baywood Canyon Road bridge downstream to Shadow Creek of Fairfax Homeowners Association (HOA). The site is well above tidal extent.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
California red-legged frog, northwestern pond turtle, northern spotted owl.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, BIRD-2, REP-1.

Maintenance Activities:
Vegetation maintenance. Sediment removal (after transition from SAFRR permits).

Maintenance Trigger:
RAS Model has channel n values ~ 0.05, intermittent floodplain and overbank flow 0.1. Very rough and dense brush. Manage for removal major flow-diverting obstructions.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 – Ross Valley

Site: **9-LAD**
Laurel Ave Ditch



Site Description:
The site is a long (850 ft) ditch on private residential parcels.

The surrounding land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Manage to retain a low flow channel and removing major obstructions.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5

Flood Control Zone 9 – Ross Valley

Site: **9-LAR-1**
Larkspur Creek



Site Description:
This site includes the tidally-influenced reaches of Larkspur Creek, from the mouth upstream to just east of Meadowood Dr.

Surrounding land use is residential development.

Type of Stream Channel:
Natural.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:
Point Reyes bird's beak, steelhead trout, California black rail, California Ridgway's rail, salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1; BIRD-1; MAMM-1.

Maintenance Activities:
Vegetation maintenance.

Best Management Practices:
A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 – Ross Valley

Site: **9-LAR-2**
Larkspur Creek



Site Description:
The site is the non-tidal portion of Lark- spur Creek from the end of Madrone Ave (Blithedale Summit Open Space Preserve) downstream to the extent of tidal influence.

Land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is mixed evergreen forest, with redwood and Douglas fir overstory.

Potentially-occurring special-status species:
Marsh microseris, northern spotted owl, and steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1, BIRD-2.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Manage to retain a low flow channel and removing major obstructions.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-MAG-1**
1100 Magnolia Ave



Site Description:
The site is located behind the commercial building at 1100 Magnolia Avenue in Larkspur.

The surrounding land use is predominantly commercial development fronting on salt marsh.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Not exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh. Predominant species are cattails in the channel and English ivy on the banks.

Potentially-occurring special-status species:
California black rail; California Ridgway's rail; and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; BIRD-1; MAMM-1.

Maintenance Activities:
Vegetation maintenance (cattail removal) and sediment removal.

Maintenance Trigger:
Pending City input.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-MAG-2**
1020 Magnolia Ave



Site Description:
The site is located behind the commercial building at 1020 Magnolia Avenue in Larkspur.

The surrounding land use is predominantly commercial development fronting on salt marsh.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Not exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is northern coastal salt marsh with dense cattails.

Potentially-occurring special-status species:
California black rail; California Ridgway's rail; and salt marsh harvest mouse.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; BIRD-1; MAMM-1.

Maintenance Activities:
Vegetation maintenance (cattail removal) and sediment removal.

Maintenance Trigger:
Pending City input. Maintenance triggers will be developed once funding can be secured. There is no timeline yet, when that funding will become available.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-MAG-3**
965 Magnolia Ave



Site Description:
The site is located behind the commercial building at 965 Magnolia Avenue in Larkspur.

The surrounding land use is predominantly commercial and residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type in the area is northern coastal salt marsh however the creek is dense cattails covering the channel.

Potentially-occurring special-status species:
California black rail; California Ridgway's rail; and salt marsh harvest mouse lower in the channel out on the salt marsh but not near the sediment removal area.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6; BIRD-1; MAMM-1.

Maintenance Activities:
Vegetation maintenance (cattail trimming) and sediment removal.

Maintenance Trigger:
Sediment removal triggered when either the outfall pipes become 50% or more occluded, or when the channel thalweg between the pipe outfall and the downstream pipe crossing does not have a continuous gradient.

Best Management Practices:
A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-MAG-4**
Magnolia Ave Ditch



Site Description:
The site is located in the 600 Magnolia Ave block.

The surrounding land use is predominantly commercial and residential development. Sediment removal from drainage ditch only in places where needed.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction. Non-tidal.

Vegetation communities:
The predominant vegetation type is median landscape on roadway and non-native, ruderal grasses

Potentially-occurring special-status species:
None

Avoidance and Minimization Measures:
None

Maintenance Activities:
Sediment removal

Maintenance Trigger:
Sediment removal will be triggered when either the outfall pipes become 50% or more occluded or when the channel thalweg between the pipe outfall and the downstream pipe crossing does not have a continuous gradient.

Best Management Practices:
A-229; A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; EV-1; EV-2; NR-1; NR-3; SC-1; SC-4 through SC-6; SS-1; SS-3; SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-MUR**
Murphy Creek



Site Description:
From the Murphy Creek culvert at Kent Ave US to border of the Town of Ross. Tidal for first 30 ft. of reach only. Includes sediment removal at culverts and crossings; vegetation efforts by collaborative community efforts under Calif. Civil Code 830.

Surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Pallid bat.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, MAMM-2.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Unmodeled low gradient tributary. Manage to retain a low flow channel and removing major obstructions.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b.

Flood Control Zone 9 – Ross Valley

Site: **9-ROS**
Ross Creek



Site Description:
The site includes Ross Creek from Glenwood Ave downstream to the confluence with Corte Madera Creek. The site is above tidal influence.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout, northern spotted owl, pallid bat.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1, BIRD-2, MAMM-2.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).

Best Management Practices:
A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 – Ross Valley

Site: **9-SAC-1**
San Anselmo Creek



Site Description:
This site is non-tidal and includes the stream within the Town of Ross.

Predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).

Best Management Practices:
A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 – Ross Valley

Site: **9-SAC-2**
San Anselmo Creek



Site Description:
This site is non-tidal and includes the stream within the Town of San Anselmo.

Predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
RAS model exists. Inset channel without floodplain. manage channel for Mannings N < 0.05 (rough but not diverting flows).

Best Management Practices:
A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Site: **9-SAC-3**
San Anselmo Creek



Site Description:
This site is non-tidal and includes the stream length within the Town of Fairfax, from Pastori Avenue downstream to the San Anselmo border.

Predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
RAS model exists downstream of Fairfax Creek confluence. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).

Best Management Practices:
A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 – Ross Valley

Site: **9-SHC-1**
Sleepy Hollow Creek



Site Description:
The site is not tidally-influenced and includes the stream length within the Town of San Anselmo.

The predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).

Best Management Practices:
A-43; A-7; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5

Flood Control Zone 9 – Ross Valley

Site: **9-SHC-2**
Sleepy Hollow Creek



Site Description:
The site is not tidally-influenced and includes the area within unincorporated Marin County, from just above the confluence with Van Winkle Creek downstream to the border of Town of San Anselmo.

The predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).

Best Management Practices:
A-43; A-67;A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-SHC-3**
Sleepy Hollow Creek



Site Description:
Culvert under road near 300 Hidden Valley Ln. The site is not tidally-influenced.

The predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5

Flood Control Zone 9 – Ross Valley

Site: **9-SCH-4**
Sleepy Hollow Creek



Site Description:
Culvert under road near 960 Butterfield Rd at Green Valley Ct. The site is not tidally-influenced.

The predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the state:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-SHC-5**
Sleepy Hollow Creek



Site Description:
Bridge at Butterfield Rd and Sleepy Hollow Dr. The site is not tidally-influenced.

The predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
Steelhead trout.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5

Flood Control Zone 9 – Ross Valley

Site: **9-SHC-6**
Sleepy Hollow Creek



Site Description:
Culvert under road at Katrina Ln. The site is not tidally-influenced.

The predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-SHC-7**
Sleepy Hollow Creek



Site Description:
Culvert under road at Van Winkle Dr.
The site is not tidally-influenced.

The predominant land use is residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-SOR**
Sorich Creek



Site Description:
The site extends from the confluence with San Anselmo Creek upstream approximately 3500 ft. The site is well above tidal influence.

Adjacent land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Small, narrow, unmodeled tributary. Floodplain = backyards. Manage channel Mannings n < 0.05 (remove major obstructions).

Best Management Practices:
A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 – Ross Valley

Site: **9-VAN-1**
Van Winkle Creek



Site Description:
The site extends from 275 Van Winkle Dr downstream to the confluence with Sleepy Hollow Creek. The site is well above tidal influence.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-VAN-2**
Van Winkle Creek



Site Description:
Culvert under Ichabod Ct. The site is well above tidal influence.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-VAN-3**
Van Winkle Creek



Site Description:
Culvert under Tappan Rd. The site is well above tidal influence.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-68; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-VAN-4**
Van Winkle Creek



Site Description:
Culvert under Mather Rd. The site is well above tidal influence.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-68; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-VAN-5**
Van Winkle Creek



Site Description:
The site extends from 275 Van Winkle Dr downstream to the confluence with Sleepy Hollow Creek. The site is well above tidal influence.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-VAN-6**
Van Winkle Creek



Site Description:
Culvert under Manitou Dr. The site is well above tidal influence.

The surrounding land use is predominantly residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Vegetation maintenance and sediment removal.

Maintenance Trigger:
Not modeled. Trigger vegetation removal when channel obstructs culvert conveyance.

Best Management Practices:
A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-WARD**
Ward St



Site Description:
The site is located along a drainage ditch off a city-owned parking lot in downtown Larkspur.

The surrounding land use is predominantly commercial and residential development.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Not exempt from USACE jurisdiction.

Vegetation communities:
The predominant vegetation type is California annual grassland.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Maintenance Trigger:
Triggered when the cattails obstruct flow through the ditch beyond the conveyance capacity of the upstream and downstream culverts.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 – Ross Valley

Site: **9-WILL**



Site Description:
444 William Ave block; drainage ditch into marsh.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
Ruderal non-native.

Potentially-occurring special-status species:
None.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6.

Maintenance Activities:
Sediment removal.

Best Management Practices:
A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

County Service Area 13 - Upper Lucas Valley

Site: **CSA-13-MC**
Miller Creek



Miller Creek.

Site Description:
The site is a riparian corridor amidst residential development and schools. The site is above tidal influence.

Type of Stream Channel:
Earthen, Modified.

Wetlands and other Waters, including Waters of the State:
Exempt from USACE jurisdiction.

Vegetation communities:
The vegetation type is north coast riparian scrub/forest. Dominant tree species include willows, oaks, and bays. Understory plants include Himalayan blackberry, native blackberry, snowberry, and vinca.

Potentially-occurring special-status species:
Steelhead trout, bats, and hayfield tarweed.

Avoidance and Minimization Measures:
GAMM-1 through GAMM-6, PLA-1, FISH-1, and MAMM-2.

Maintenance Activities:
Vegetation maintenance.

Maintenance Trigger:
This creek is through a neighborhood that flooded in recent years due to debris in the creek. We remove debris and vegetation in the active channel that could lead to further accumulation of debris and sediment.

Best Management Practices:
A-67; A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

APPENDIX E

BIOLOGICAL ASSESSMENT

BIOLOGICAL ASSESSMENT FOR ROUTINE FLOOD CONTROL MAINTENANCE ACTIVITIES MARIN COUNTY, CALIFORNIA



June 2012

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SUMMARY

The Marin County Flood Control and Water Conservation District (District) is proposing to conduct annual vegetation maintenance, vegetation removal, and sediment removal activities at 96 project sites along several creeks in Eastern Marin County and Stinson Beach area within its jurisdiction. We prepared this biological assessment of the study area to determine the potential for the occurrence of special-status plant or animal species, or sensitive vegetation communities, within the areas to be affected by the project.

The majority of the vegetation maintenance and sediment removal work occurs in eastern county creeks draining into San Pablo Bay, from Novato Creek in the north to Coyote Creek in the south. There are only three project sites in western Marin County on Easkoot Creek in Stinson Beach, draining to the Pacific Ocean. Most of the maintenance activities occur within urbanized, residential and commercial land uses. Some of the lower reaches include tidally-influenced land reserved for wildlife and flood control purposes; these lands, while having been subject to human activity, now represent the more natural areas within the program scope. Most of the land in the upper reaches is largely undeveloped open space or grazing land.

Vegetation communities present within and adjacent to the study area include California annual grassland, northern coastal salt marsh, diked baylands, north coast riparian scrub/forest, and mixed evergreen forest.

We pulled endangered species listings from the USFWS for the following USGS quads: Bolinas, Petaluma Point, Novato, San Rafael, and San Quentin. We also checked the State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFG 2010a), Special Vascular Plants, Bryophytes, and Lichens (CDFG 2010b), State and Federally Listed Endangered and Threatened Animals of California (CDFG 2010c), Special Animals (CDFG 2009) lists and the California Wildlife Habitat Relationship System (CDFG 2008), as well as the online Inventory of Rare and Endangered Plants (CNPS 2010) for Marin County. Based on these searches, a literature and database review and a familiarity with the flora within the project region, we created the list of special status species. Altogether, there are 113 species on the list, of which 41 are listed or candidates for listing, and 72 are federal or state species of concern. Special Status Species Reported or Potentially Occurring at the Project Sites is included in Appendix A.

For plants, there are 12 listed species in the selected USGS quadrangles. From the species of concern lists, which are not linked to quad maps, we pulled the species that occur in Marin County, based on CNPS lists, records in the CNDDB, and/or range information from CWHR, resulting in 21 species of concern. Based on the data available, none of the listed species and four of the species of concern are likely or somewhat likely to occur in the project sites.

Similarly, for animals, there are 29 listed species in the selected quads, and 46 species of concern. Based on the data available, eight of the listed species and six of the species of concern are likely or somewhat likely to occur in the project sites.

The project sites in West Marin at Easkoot Creek are the only locations where two of the listed species (coho salmon and California red-legged frog) and two species of concern (monarch butterfly and marsh milk-vetch) could potentially occur.

An analysis is presented for each of the work sites and their potential to support special-status species. The potential for special-status plant or wildlife species to occur within or immediately adjacent to each individual project work site is in most cases based on the presence of suitable habitat or the known presence of a species within the vicinity of the work site. Therefore, within the site-specific analysis, unless otherwise noted, those species that are listed for each work site are considered to have at least some potential to occur within the work site.

Based on the actual or potential presence of certain special-status wildlife species within the project site, recommendations are made to either avoid or minimize potential impacts to them. Appropriate site-specific and species-specific recommendations are given for certain species, including work windows, pre-construction surveys, additional focused surveys, avoidance measures, disturbance minimization, exclusionary fencing, and construction monitoring, among others.

Based on our assessment of habitats in the project sites, certain special-status plant and animal species are not expected to occur or can be ruled out. However, focused wildlife surveys or botanical surveys were not conducted as part of this reconnaissance-level site evaluation. The methods employed would not necessarily rule out some special-status species.

We have made a preliminary determination of project sites that we believe to fall under the under the jurisdiction of the U.S. Army Corps of Engineers (USACE), as well as the identification of potential waters of the State of California, which are anticipated to fall within the jurisdictions of California Department of Fish and Game (CDFG) and/or the Regional Water Quality Control Board (RWQCB). These determinations are listed in Appendix B.

Aquatic resources, including riparian areas, wetlands, and certain aquatic vegetation communities are considered sensitive biological resources and can fall under the jurisdiction of several regulatory agencies. Within or adjacent to the project sites proposed for vegetation maintenance, sediment removal, and levee maintenance there are two sensitive natural communities that have the potential to be affected by project activities. These include northern coastal salt marsh at Almonte Marsh in Tam Valley, Estancia Ditch in Santa Venetia, and lower Novato Creek; and coastal brackish marsh adjacent and downstream of the Coyote Creek project site. Almost all of the work sites are expected to fall under federal and/or state jurisdictions as wetlands or waters of the U.S. or waters of the state, and will thus require permits from various state and federal agencies including the USACE, CDFG, and RWQCB.

A copy of this report should be submitted to the USACE, North Branch, San Francisco District, with a request for field verification of the preliminary wetland delineation.

1.0 INTRODUCTION AND METHODS

The County of Marin Department of Public Works (DPW) in conjunction with the Marin County Flood Control and Water Conservation District (District) is proposing to conduct vegetation maintenance and sediment removal activities along several creeks in Marin County, California in order to clear debris and to maintain flood conveyance and stream flow. The maintenance work primarily occurs on parcels owned in fee title or held as easements by the District, the County, other County agencies, or partnering city jurisdictions; however, there are four project sites where the District has no formal jurisdiction and therefore will secure landowner access agreements before commencing work. These sites are Reed Creek (project site 3-REED-1; 99 landowners), Sutton Manor/Shell Rd (project site 3-SUT-5; 15 landowners), East Creek (project site 4-EAST-2), and Zone 7 Gallinas South Fork levees (project site 7-GAL; total of 110 landowners, but generally only 5-10 parcels per year will need to be accessed). The purpose of the biological assessment is to determine the potential for the occurrence of special-status plant or animal species, or sensitive vegetation communities within the areas affected by the project. This report presents the results of our field investigations.

The study area includes a total of 96 project sites in six Flood Control Zones (zones 1, 3, 4, 5, 7, and 9) and one non-Flood Zone project site in County Service Area 13 Upper Lucas Valley (Figure 1). There are 26 project sites located in Flood Control Zone 1 in the Novato Creek watershed, 33 project sites in Flood Control Zone 3 in Mill Valley, six project sites in Flood Control Zone 4 in Bel Aire/Strawberry, three project sites along Easkoot Creek in Flood Control Zone 5 in Stinson Beach, 13 project sites in Flood Control 7 in Santa Venetia, 14 project sites in Flood Control Zone 9 in the Corte Madera Creek watershed, and one project site falls outside the flood control zones along Miller Creek in the Miller Creek watershed. Aside from the project sites in Stinson Beach, all the other project sites are located in eastern Marin County.

Nomenclature used throughout this report conforms to Hickman (1993) for plants unless otherwise noted. Nomenclature for special-status plant species conforms to CDFG (2010a,b) and CNPS (2010); nomenclature for special-status animals conforms to CDFG (2009 and 2010c); nomenclature for special-status natural communities conforms to CDFG (2011). Nomenclature for wildlife conforms to Sibley (2000) for birds, Stebbins (2003) for reptiles and amphibians, and Jameson Jr. and Peeters (1988) for mammals. Plant community descriptions generally follow Holland (1986).

District biologists performed a reconnaissance-level survey at all project sites. All distinctive plant communities were noted and described, and all plant and wildlife species detected were identified and recorded. Appendix D lists the plant species detected and Appendix E lists the wildlife species detected. See Appendix F for a copy of the site assessment data sheet.

The surveys were intended as an initial evaluation of on-site habitat types at the project sites and an assessment of the potential for occurrence of special-status plant and wildlife species at those project sites. The evaluation did not include focused wildlife surveys or botanical

Figure 1. Project Areas



surveys, and therefore is not considered adequate to report negative findings for some special-status species. However, based on the surveys conducted to date and an assessment of available habitats on site, certain special-status plant and animal species are not expected to occur or can be entirely ruled out.

An inventory of plant species noted within the immediate vicinity of the project sites is presented in Appendix D. Wildlife species noted on site are listed in Appendix E.

Based primarily on visual inspections, a preliminary determination will be made as to the extent of jurisdictional waters or wetlands at project sites that may be subject to Corps jurisdiction. For sites with a well-defined, often unvegetated, stream channel is present, the extent of waters of the U.S. will be estimated based on the apparent limits of "ordinary high water," as indicated by scour marks on opposite sides of the banks, alluvial deposits, drift lines or debris, or shelving. In other cases, where strongly hydrophytic vegetation is dominant and there is obvious wetland hydrology (e.g. inundation or soils saturated at the surface), it will be reasonable to assume that hydric soils are present, and that the parameters will be met for the classification of the site as a wetland under federal guidelines (Environmental Laboratory 1987).

A formal wetland delineation and preliminary jurisdictional determination has not yet been conducted. When completed, the extent, where applicable, of waters of the U.S. expected to fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE), will be identified within each of the sites. When the wetlands delineation is conducted, potential waters of the State of California, which are anticipated to fall under the jurisdiction of the California Department of Fish and Game (CDFG) and/or the Regional Water Quality Control Board (RWQCB) will also be identified.

A routine wetland delineation and preliminary jurisdictional determination will be performed in accordance with the procedures outlined in the USACE Wetlands Delineation Manual (Environmental Laboratory 1987). Based on topography and the presence or absence of field indicators including vegetation, hydrology, and soils, the limits of potentially jurisdictional waters of the U.S. will be determined.

2.0 EXISTING CONDITIONS

2.1 Setting

The District's flood control routine maintenance activity area covers several creeks draining eastward to San Pablo Bay, extending from the Novato Creek watershed in the north to the Richardson Bay watershed in the south in the largely urbanized eastern portions of the county, and a portion along Easkoot Creek draining into the Pacific Ocean at Stinson Beach.

Development patterns in Marin County are such that much of the valley floors are urbanized, with housing, commercial developments, and roads. Stream corridors sometimes have tree cover, but are sometimes more open through these areas; in almost all cases they are heavily impacted by human use, with concrete channelization, straightening, building piles in the creek, constrained riparian corridors, impacted floodplains, and nonnative invasive species. The upper reaches of creeks extend past the developed areas into woodlands and forests; many creek headwaters begin in Marin County Open Space lands. The lower reaches of creeks are tidally influenced, often with very little topographic relief, and while less developed, are often constrained by roads (such as Highways 101 and 37), levees, and other human-induced development.

The San Andreas Fault, running offshore through Bolinas Lagoon and up Tomales Bay, splits the County into two distinct geologic landscapes: the Pacific Plate lies on the west side of the fault and is comprised of Cretaceous granitic rock of the Monterey formation overlain with Cenozoic marine sedimentary deposits. All of the proposed project sites are located east of the fault on the North American Plate, which is comprised of Cretaceous sedimentary and metamorphic rocks of the Franciscan Complex (Sloan 2006) with Mesozoic marine sandstones and shales, cherts, and serpentines (Shuford & Tomassi 1989).

2.2 Plant Communities and Wildlife Habitats

The work sites proposed as part of this project can be separated into two basic groups: areas that are located within largely urbanized areas (where work may occur on easements adjacent to residential backyards, road rights of way, etc.), and areas in more natural settings, such as lower Novato Creek where we maintain levees surrounded by open water. In both instances, vegetation maintenance activities have been undertaken for a number of years; these work sites have been subjected to limbing and trimming, mowing, and trash clearing. The levees experience infrequent vehicle use from Flood Control, as well as Vector Control, utilities, and city/town jurisdictions to perform their duties. While these sites often support native species, it should be clear that these sites are not pristine and have been heavily impacted by urban development.

The vegetation communities described below are present within or adjacent to work sites. The descriptions generally follow Holland (1986). Diked baylands follow work by the Goals Project (2000) and BAASMA (2006). These communities include annual grassland, northern coastal salt marsh, north coast riparian scrub/forest, and mixed evergreen forest.

California Annual Grassland

Historically, grasslands in California were dominated by perennial bunchgrasses. However, the vast majority of grasslands have converted from native perennial species to Mediterranean annual grass species, resulting in an annual grassland habitat dominated by nonnative *Bromus* and *Erodium* species and others (Bartolome 2007). The low-elevation grasslands are especially prone to host nonnative species, with some 400 nonnative taxa included in grasslands species.

In addition to areas of open grassland, this habitat also describes many of the habitat remnants found in the easements where maintenance activities occur, such as between residential properties, in open disturbed areas on the landside of levees, and in areas where ditches have been constructed to direct water (where water would not have flowed before development).

Nonnative grassland species include wild oats (*Avena sp.*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), filaree (*Erodium sp*.), star thistle (*Centaurea sp*.), bull thistle (*Cirsium vulgare*), Italian thistle (*Carduus pycnocephalus*), rattlesnake grass (*Briza maxima*), little rattlesnake grass (*Briza minor*), foxtail (*Hordeum murinum*), dandelion (*Taraxacum officinale),* Italian ryegrass *(Lolium multiflorum*), and wild mustards *(Brassica spp. and Hirschfeldia incana).*

Native grassland species include wild hyacinths, clovers (*Trifolium sp*.), ground iris (*Iris macrosiphon*), owl's clover, goldfields (*Lasthenia sp*.), blue wild-rye (*Elymus glaucus ssp. Glaucus*), purple needlegrass (*Nassella pulchra*), melic grass (*Melica californica*), creeping wildrye *(Leymus triticoides*), and annual fescue (*Vulpia microstachys*).

Project sites in this habitat are generally found in upland areas that are now predominately converted to urban development, such as San Marin and San Ramon creeks in Novato, the Castro and Mabry ditches in Santa Venetia, and the Sutton Manor area of Mill Valley.

Northern Coastal Salt Marsh

Northern coastal salt marsh is defined by fluctuating water and salinity levels. The dominant plants are those that have adapted to tolerate high salt levels. There are three main parts to the salt marsh, with each part containing different mixes of species: low, middle, and high, though these parts intergrade depending on topography.

Few plants can tolerate the salinities present in the low marsh areas, generally defined as the area between mean sea level to mean high water (Baye et al 2000). Native Pacific cordgrass (*Spartina foliosa)*, nonnative (and invasive) smooth cordgrass (*Spartina alterniflora*), and annual pickleweed (*Salicornia europaea)* can be found in the low marsh zone where salinities are highest.

Mid-marsh zones are dominated by pickleweed (*Salicornia virginica)* but also include native species such as saltgrass (*Distichlis spicata)*, Pacific cordgrass (*Spartina foliosa)*, salt marsh

dodder (*Cuscuta salina)*, jaumea (*Jaumea carnosa),* spear scale (*Atriplex triangularis*), and alkali-heath (*Frankenia salina).* Nonnative dense-flowered cordgrass (*Spartina densiflora)* is also common to the middle zones.

Natural upper marsh habitats such as upland marsh edges or ecotones are no longer common, with much urban development taking their place. Human-made areas of high marsh include levee banks which often significantly shorten the area available. Characteristic native species in the upper marsh include gumplant (*Grindelia stricta var. angustifolia),* sea lavender (*Limonium californicum)*, saltgrass (*Distichlis spicata),* spear scale (*Atriplex triangularis*), alkali-heath (*Frankenia salina),* cattails (*Typha spp*), and salt rush (*Juncus lesueurii).* Nonnative species include pepper grass (*Lepidium latifolium)* and fennel (*Foeniculum vulgare*)

Project sites in this habitat are found in the tidal reaches of the following creeks: Rush, Novato, Warner, Gallinas, Corte Madera, East, West, Almont Marsh, Arroyo Corte Madera del Presidio, and Coyote Creeks in East Marin, and in Easkoot Creek at Bolinas Lagoon upstream almost to Calle de Pinos in West Marin.

Diked Baylands

Formerly tidally-influenced salt marsh, some baylands along San Pablo Bay were diked in order to reclaim land for pasture and hayfields in the late 1800's (Baye 2000). Now severed from natural tidal processes by levees and water control structures, these diked baylands constitute a mixed community. The construction of levees and inland ditches, along with the locations of natural tidal creeks, diverse topography, differing quantities of peat, varying amounts of freshwater inputs, and varying amounts of saltwater intrusion result in a patchwork of plants, some more characteristic of salt marsh and others more characteristic of brackish or freshwater marsh (Baye 2000).

Past uses of the diked lands as pasture and nonnative hay fields have resulted in largely nonnative weedy species composition. These areas do not generally support important salt marsh species such as Pacific cordgrass (*Spartina folioso*), Mason's lilaeopsis (*Lilaeopsis masonii), s*mooth goldfields (*Lasthenia glabrata)*.

In the more saline areas, native species such as saltgrass (*Distichlis spicata)*, pickleweed (*Salicornia virginica)*, alkali-heath (*Frankenia salina)*, spear scale (*Atriplex triangularis*), dodder (*Cuscuta salina)*, alkali bulrush (*Scirpus maritimus*) and cattails *(Typha spp)* are common.

Species common to the brackish habitats include Baltic rush (*Juncus balticus)*, goosefoot *(Chenopodium berlandieri)*, purslane (*Sesuvium verrucosum*), dock *(Rumex crispus)*, barley *(Hordeum marinum var. gussoneanum)*, poison hemlock *(Conium maculatum)*, sago pondweed *(Potamogeton pectinatus*), and rabbitfoot grass *(Polypogon monspeliensis)*.

Native freshwater species such as popcorn flower (*Plagiobothrys stipitatus*), toad rush (*Juncus bufonius*), flowering quillwort (*Lilaea scilloides*), and nonnative species such as

brass-buttons *(Cotula coronopifolia),* dittrichia *(Dittrichia graveolens)*, bird's foot trefoil *(Lotus corniculatus)*, oat bent-grass *(Agrostis avenacea)*, wild mustards *(Brassica spp. and Hirschfeldia incana)*, loosestrife *(Lythrum hyssopifolia)*, and sweet fennel *(Foeniculum vulgare*) may be found in areas of diked baylands.

Project sites in this habitat are found in stream reaches and baylands now behind levees and tidegates: Arroyo de San Jose, Baccaglio Basin, Lynwood Slough, Pacheco, Ryan, and various sites within Santa Venetia.

North Coast Riparian Scrub/Forest

Riparian habitats are found on gravelly stream banks. Dominate tree species are willow (*Salix sp.*) and alders (*Alnus sp.*). Other tree and shrub species include western sycamore *(Platanus racemosa)*, bigleaf maple *(Acer macrophylum)*, cottonwood *(Populus fremontii)*, box elder *(Acer negundo californicum)*, elderberry *(Sambucus caerulea)*, California bay laurel *(Umbellularia californica)*, and valley oak *(Quercus lobata)*. Understory species commonly include horsetail (*Equisetum* sp.), lady fern (*Athyrium filix-femina* var. *cyclosorum*), California blackberry *(Rubus vitifolius)*, creeping snowberry (*Symphoricarpos albus* var. *laevigatus*), and poison oak *(Toxicodendron diversilobum*). Nonnative species such as Himalayan blackberry (*Rubus armeniacus*) and periwinkle (*Vinca minor*) are common understory species.

Most of the project sites included in the Program are in riparian habitat, which is generally found in the non-tidal reaches of creeks: Novato Creek, Arroyo de San Jose, Pacheco Creek, Miller Creek, and Nyhan Creek in East Marin and Easkoot Creek upstream of Highway 1 in West Marin.

Mixed Evergreen Forest

This community is dominated by broadleaved evergreen trees. Coast live oak (*Quercus agrifolia*) and California bay (*Umbellularia californica*) are the dominant canopy species; understory species include madrone *(Arbutus menzeisii*), bigleaf maple *(Acer macrophylum),* California blackberry *(Rubus vitifolius)*, poison oak *(Toxicodendron diversilobum*) and sword fern (*Polystichum munitum*). Black oak (*Quercus kelloggii*), chinquapin (*Chrysolepis chrysophylla*), California huckleberry *(Vaccinium ovatum)* and wild rose (*Rosa gymnocarpa*), and are also common species in this community.

Project sites in this habitat are found in Crest Marin Creek in Mill Valley and at the Thompson trash rack, Meadow Way trash rack, and La Pasada inlet in Santa Venetia.

3.0 SPECIAL-STATUS BIOLOGICAL RESOURCES

Prior to conducting fieldwork, the California Natural Diversity Data Base (CNDDB) (CDFG 2011) was reviewed for the most recent distribution information for special-status plant and animal species within the Petaluma River, Novato, San Rafael, San Quentin, Point Bonita, and Bolinas quadrangles.

Other information on special-status plant species was compiled through a review of the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Plants of California* (CNPS 2010), the California Department of Fish and Game's (CDFG) *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (CDFG 2010a) and *Special Vascular Plants, Bryophytes, and Lichens List* (CDFG 2010b), and the U.S. Fish and Wildlife Service's (USFWS) *Endangered and Threatened Plant and Animal Taxa; Proposed Rule* (USFWS 1996a, 1999b). Also reviewed for special-status plant occurrences was *Marin Flora* (Howell et al. 2007).

Additional information on special-status animal species was compiled through a review of the CNDDB (CDFG 2011), CDFG's *State and Federally Listed Endangered and Threatened Animals of California* (CDFG 2010c), *Special Animals List* (CDFG 2009), and California Wildlife Habitat Relationship System (CDFG 2008), and USFWS's *Endangered and Threatened Wildlife and Plant*s (USFWS 1996a, 1999b).

3.1 Special-Status Plants

Special-status plant species include those listed as Endangered, Threatened, Rare or those species proposed for listing by the USFWS (2001b), the CDFG (2010a,b) and the CNPS (2010). The CNPS listing is sanctioned by the CDFG and serves essentially as their list of "candidate" plant species. CNPS List 1B and List 2 species are considered eligible for state listing as endangered or threatened under the CDFG Code. Such species should be fully considered during preparation of environmental documents subject to the California Environmental Quality Act (CEQA). CNPS List 3 and List 4 species are considered to be either plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS and CDFG recommend that these species be evaluated for consideration during the preparation of CEQA documents.

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites (Appendix A). Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed; all are species of concern.

Based on a reconnaissance-level survey and habitat assessment, many of the 33 species with at least some potential to occur within the region can be ruled out from the work sites due to the lack of suitable habitat within the project corridor. Specialized habitats such as playas, coastal dunes, lower montane coniferous forest, vernal pools, coastal bluff scrub, coastal

prairie, and serpentine-derived soils or outcrops are not present within the study area or work sites.

Although location data for several special-status plant species places them within the study corridor, the presence of some of these within the work sites remains highly unlikely. In many cases, the location data from CNDDB represent historic data from the time period before large-scale development. In other cases, the CNDDB data represent best guesses as to location, and while shown as covering our project sites, the required habitat may not be present within the work sites.

Nevertheless, certain special-status plant species, have at least some potential to occur within some of the project sites, and cannot be ruled out without appropriately timed, focused botanical surveys, if work is occurring in these specific habitat types.

Special Status Plant Species

The following is a brief discussion of the four special status plant species noted in Appendix A for additional analysis. These species are considered to have some potential to occur within one or more of the work sites, due to the presence of suitable habitat, the plant was detected during the site reconnaissance, and/or the species has been reported within the vicinity of the work sites.

Point Reyes bird's-beak (*Cordylanthus maritimus ssp. palustris*)

STATUS. Point Reyes bird's beak is a federal species of special concern and is listed by the CNPS as 1B.

PROJECT SITE OCCURRENCE. The CNDDB lists 42 occurrences of Point Reyes bird's beak in Marin County; the majority of these are on the western coast. Sites near CNDDB occurrences include: 3-BM, 3-MIL-3, 3-RYC-1, 3-SUT-1, 5-EAS-1, 5-EAS-2, 5-EAS-3.

SPECIES ACCOUNT. The species has recently had a name change; CNPS now refers to the Point Reyes bird's beak as *Chloropyron maritimum ssp. palustre.* It is an annual plant that grows in **c**oastal salt marsh from Oregon to California. In Marin, there are populations along the coast and San Pablo Bay. The plant blooms June to October.

POSSIBLE IMPACTS. Point Reyes bird's beak may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and maintenance, and repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing, and temporary loss of habitat which may result in disturbance or mortality.

Pale Yellow/Hayfield tarplant (*Hemizonia congesta ssp. congesta*)

STATUS. The pale yellow tarplant is not listed by the federal or state governments but is listed by the CNPS as 1B.

PROJECT SITE OCCURRENCE. The CNDDB lists a record in Ignacio near sites 1-ASJ-1, 1-ASJ-2, and 1-ASJ-3.

SPECIES ACCOUNT. An annual herb, the pale yellow tarplant grows in coastal scrub/valley and foothill grassland habitats, and sometimes roadsides. The plant blooms from April to November. The petals are almost white, in contrast to the yellower petals of the closely related, but not listed, *Hemizonia congesta ssp. lutescens*; with which it hybridizes.

POSSIBLE IMPACTS. Pale yellow tarplant may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and maintenance, and repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing, and temporary loss of habitat which may result in disturbance or mortality.

Marsh microseris (*Microseris paludosa*)

STATUS. The marsh microseris is not listed by the federal or state governments but is listed by the CNPS as 1B.

PROJECT SITE OCCURRENCE. The CNDDB lists occurrences in the vicinity of sites: 3-CAS, 3-ACMP-3, and 9-LAR-2.

SPECIES ACCOUNT. The marsh microseris is a perennial herb that grows in moist grassland or open woods in **c**losed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland. The plant blooms from April to July. It is endemic to California and ranges from Marin County and San Francisco Bay Area south along the central coast to Santa Barbara.

POSSIBLE IMPACTS. Marsh microseris may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and maintenance, and repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing, and temporary loss of habitat which may result in disturbance or mortality.

Marin knotweed (*Polygonum marinense*)

STATUS. Marin knotweed is a federal species of special concern and is listed by the CNPS as 3 (needing taxonomic review).

PROJECT SITE OCCURRENCE. The CNDDB contains record for Marin knotweed on Corte Madera Creek, just downstream of site 9-CMC-1 and at the creek mouth.

SPECIES ACCOUNT. The Marin knotweed is an annual herb that grows in coastal salt or brackish marshes and swamps and blooms from April to October. Currently, there are fewer than twenty known occurrences. Its taxonomic status is uncertain; it is possibly a synonym of *P. robertii*, a non-native plant.

POSSIBLE IMPACTS. Marin knotweed may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and

maintenance, and repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing, and temporary loss of habitat which may result in disturbance or mortality.

3.2 Special-Status Wildlife

Special-status animal species include those listed by the USFWS under the federal Endangered Species Act (1996a, 1999b) and by the CDFG under the California Endangered Species Act (2009, 2010c). The USFWS officially lists species as either Threatened, Endangered, or as Candidates for listing. Additional species receive federal protection under the Bald Eagle Protection Act (*e.g.*, bald eagle, golden eagle), the Migratory Bird Treaty Act (MBTA) and state protection under CEQA §15380(d). All birds, except European starlings, English house sparrows, and rock doves (pigeons), are protected under the MBTA. In addition, many other species are considered by the CDFG to be Species of Special Concern; these are listed in Remsen (1978), Williams (1986), and CDFG (2009). Although such species are afforded no official legal status, they may receive special consideration during the CEQA review process. The CDFG further classifies some species under the following categories: "Fully Protected", "Protected birds" (CDFG Code §3511), "Protected mammals" (CDFG Code §4700), "Protected amphibian" (CDFG Code §5050 and Chapter 5, §41), "Protected reptile" (CDFG Code §5050 and Chapter 5, §42), and "Protected fish" (CDFG Code §5515). The designation "Protected" indicates that a species may not be taken or possessed except under special permit from CDFG; "Fully Protected" indicates that a species can be taken for scientific purposes by permit only (CDFG 2009). The Fish and Game Code §§3503, 3505, and 3800 prohibits the take, destruction or possession of any bird, nest or egg of any bird except English house sparrows and European starlings unless express authorization is obtained from CDFG.

Based on quad searches and special status species listings from federal and state agencies searches, 80 animal species have been identified as having some potential of occurring within the project sites (Appendix A). Of these, only 16 species, based on literature and database reviews and familiarity with local fauna, are considered likely to occur within the project sites. Eight of these are listed; eight others are species of concern. Those species with a moderate to high potential to occur, or those species prominent in the regulatory environment are discussed herein.

Special Status Wildlife Species

The following is a brief discussion of the special status wildlife species noted in Appendix A for additional analysis. These species are considered to have some potential to occur within one or more of the work sites, due to the presence of suitable habitat, the species was detected during the site reconnaissance, and/or the species has been reported within the vicinity of the work sites. Section 5.0 includes a discussion of each individual site and the potential to support those species discussed herein.

Invertebrates

Monarch butterfly (*Danaus plexippus*)

STATUS. The monarch butterfly is not federally or state listed; however, its roosting habitat is often reviewed under CEQA.

PROJECT SITE OCCURRENCE. The monarch butterfly is known to utilize the area near the two Easkoot Creek project sites for overwintering habitat from September to March (U.S. Department of the Interior 2002).

SPECIES ACCOUNT. Monarchs range from southern Canada, through North America and far into South America. They rely on the milkweed plant as a primary food source and for caterpillar hosting. The California coast is an important overwintering area for the monarchs west of the Rockies; migration starts in August and the butterflies are usually at the overwintering sites by October. The butterflies roost in trees and can form large aggregations with many individuals. Potentially suitable roosting habitat occurs adjacent to the Easkoot Creek project sites.

POSSIBLE IMPACTS. Proposed activities will not directly affect the butterflies but could produce disturbances and harassment to them. Most of the proposed maintenance activities will occur before the butterflies migrate into the area. Impacts can be avoided by completing work at the Easkoot Creek sites before September 1; otherwise, potential impacts can be mitigated by checking the sites for presence of monarchs, and if detected, allowing them to leave the area.

Fish

Central California Coast ESU Coho (*Oncorhynchus kisutch*)

STATUS. The Central California Coast ESU coho salmon (*Oncorhynchus kisutch*) is a federal and state endangered species. This ESU includes all naturally spawned populations of coho salmon from Punta Gorda in northern California south to the San Lorenzo River in central California (NOAA 2001). Critical habitat has been designated; for Marin County, critical habitat includes all river reaches draining to the Pacific Ocean (or bays) that are accessible to coho, as well as two rivers draining to San Pablo Bay: Arroyo Corte Madera del Presidio and Corte Madera Creek (DFG 2004).

PROJECT SITE OCCURRENCE. The project sites fall within the Central California Coast ESU, in particular the project sites on Easkoot, Arroyo Corte Madera del Presidio, and Corte Madera Creeks. While CNDDB lists only one record in Marin, on Redwood Creek in the San Rafael quad, coho are known in several additional west-draining creeks in Marin County. In 2002, 82 juvenile coho were observed in Easkoot Creek (NPS 2003). While they were historically known to populate Arroyo Corte Madera del Presidio and Corte Madera Creek, coho have not been observed in those creeks since 1981 (Leidy 2007).

SPECIES ACCOUNT. Coho salmon are anadromous, growing and maturing in the ocean before returning to their natal freshwater streams to spawn. The first heavy rains of the season set off the coho spawning season, generally between November and January but could be as long as September to March (Bettelheim 2002). Suitable nest sites are often located at riffles and have small to medium sized gravel. After coho fry emerge from their eggs, they remain

in the freshwater creeks, feeding and growing until the next spring. The following spring, almost a year after their emergence, juvenile coho make a seaward migration downstream to the ocean, where they will spend approximately 1 ½ years before returning to spawn (Bettelheim 2002).

POSSIBLE IMPACTS. Reduction in water quality, increased water temperatures, degradation or destruction of instream habitat, increased sedimentation, and dewatering could cause direct mortality of adult or juvenile fish or eggs as well as impair reproductive success.

Central California Coast DPS Steelhead (*Oncorhynchus mykiss irideus*)

STATUS. The Central California Coast Distinct Population Segment steelhead is a federal threatened species and a state special animal. Critical habitat has been designated for the following creeks in Marin County: Estero Americano, Easkoot Creek, Corte Madera Creek, Larkspur Creek, Cascade Creek, Old Mill Creek, Ross Creek, San Anselmo Creek, Sleepy Hollow Creek, Tamalpais Creek, Arroyo Corte Madera del Presidio. Novato Creek was proposed for critical habitat designation but was excluded due to an economic analysis by the Fish and Wildlife Service **(**USFWS 2005).

PROJECT SITE OCCURRENCE. There are no CNDDB records in the project quads, but Central California Coast steelhead are known to occur in Easkoot Creek (NPS 2002), and Novato Creek, Miller Creek, Gallinas Creek, Corte Madera Creek, Arroyo Corte Madera del Presidio, and Coyote Creek watersheds (Leidy 2007), although current habitat quality, availability, and accessibility, and thus population sizes, have been drastically reduced compared to historic levels.

SPECIES ACCOUNT. Steelhead trout are born in freshwater streams, where they mature and grow for 1-3 years before migrating to the ocean. They spend from 1-4 growing seasons in the ocean, where most of their growth occurs (USFWS 2010a). The fish then return to their natal streams to spawn. Spawning usually occurs from November to February. Steelhead require cool, clean water in streams that contain adequately sized spawning gravels, instream cover, and intact riparian forests for shading. Downed trees, rootwads, and undercut banks provide important habitat elements for steelhead, which must provide cover and low stream velocities as the fish are not strong enough to withstand heavy currents. Water quality and quantity are important habitat requirements for steelhead (Leidy 2000).

POSSIBLE IMPACTS. Reduction in water quality, increased water temperatures, degradation or destruction of instream habitat, increased sedimentation, and dewatering could cause direct mortality of adult or juvenile fish or eggs as well as impair reproductive success.

Amphibians

California red-legged frog (*Rana draytonii*)

STATUS. California red-legged frog is a federal threatened species and a California species of special concern. Critical habitat has been designated; however, no areas within the selected quads are within the critical habitat designation.

PROJECT SITE OCCURRENCE. In Marin County, red-legged frogs are more common in western than eastern Marin. Within the project site, the greatest potential for red-legged frogs is at the Easkoot Creek work sites.

SPECIES ACCOUNT. Optimal habitat includes ponds, stream courses, and permanent pools with largely intact emergent or shoreline vegetation, such as cattails, tules or willows, and absence of competitors/predators such as bullfrogs and largemouth bass. The species breeds in stock ponds, pools, and slow-moving streams with emergent vegetation for cover and egg attachment. Red-legged frogs have been found in less-optimal habitat such as concrete-lined pools, isolated wells, stock ponds absent of shoreline vegetation, and in refuse piles near ponds.

POSSIBLE IMPACTS. This species may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and maintenance, repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing of nests and young, and temporary loss of breeding habitat which may result in disturbance or mortality.

Reptiles

Northwestern pond turtle (*Clemmys* (*Actinemys*) *marmorata marmorata*)

STATUS**.** The northwestern pond turtle is a candidate for federal listing; the state lists it as a species of concern. No critical habitat has been designated.

PROJECT SITE OCCURRENCE**.** There are seven CNDDB records in the selected quads, five are north of the Petaluma River, one is well outside our project site in Redwood Creek, and one is at Phoenix Lake. None of the occurrences are located on or near the project sites.

SPECIES ACCOUNT**.** There are two subspecies of western pond turtle, with a zone of intergradation occurring from the San Joaquin Valley east to the San Francisco Bay Area. The northwestern pond turtle (*C. m. marmorata*) is the subspecies that occurs in Marin County (Michaud 2008). The southwestern pond turtle (*C. m. pallida*) fills out the southern range. Pond turtles have been observed in slow-moving streams, lakes, reservoirs, wetlands, stock ponds, and sewage treatment plant ponds. Their preferred aquatic habitat includes refugia such as undercut banks, submerged vegetation, rocks, logs, and mud banks; turtle densities can be higher with greater availability of basking sites (Jennings and Hayes 1994). Pond turtles are known to utilize upland terrestrial habitats, most often during the summer for mating, egg-laying, and overland dispersal, and in winter for overwintering (Holland 1994).

POSSIBLE IMPACTS. This species may be exposed to impacts during project implementation includes sediment and debris removal, vegetation management and maintenance, repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing of nests and young, and temporary loss of breeding habitat which may result in disturbance or mortality.

Birds

California clapper rail (*Rallus longirostris obsoletus*)

STATUS. The California clapper rail is a federal and state listed endangered species. No critical habitat has been designated.

PROJECT SITE OCCURRENCE. Clapper rails have been reported in Bolinas, Petaluma River, Novato, San Rafael, and San Quentin quads. This species nests and forages in tidal wetlands with pickleweed, cordgrass, and bulrush

SPECIES ACCOUNT. California clapper rails occur almost exclusively in tidal salt and brackish marshes dominated by dense stands of cordgrass and pickleweed, with unrestricted daily tidal flows, well developed tidal channel networks, and suitable nesting and escape cover during extreme high tides. They utilize the lower marsh zone, typically consisting of sparse vegetation and tidal sloughs, for foraging, and the upper marsh zone, typically consisting of dense vegetation, for cover, breeding and high tide refugia (Albertson and Evens 2000). Networks of tidal channels are the most important element of foraging habitat, where they feed on invertebrates including mussels, clams, crabs, snails, insects and fish (Albertson and Evens 2000). Nests are constructed about 2 ft above the ground and generally within 10 ft of active channels or open bay water (Shuford 1993). The nests are often accessed through tunnels in the vegetation for additional protection.

The breeding season for California clapper rails extends from February to August, with most nesting activity typically between March and May. The birds are most active at sunrise and sunset.

Based on known occurrences and the presence of suitable habitat within or adjacent to several of the work sites, California clapper rail could potentially occur in certain project sites in the lower creek systems of Novato Creek, South Fork of Gallinas Creek, and Bothin Marsh.

At other project locations, the presence of this species is highly unlikely.

POSSIBLE IMPACTS. The most likely impact to California clapper rail is noise disturbance from maintenance activities. Sediment removal at approximately 15 sites may directly impact pickleweed and other salt marsh vegetation.

California black rail (*Laterallus jamaicensis coturniculus*)

STATUS. The California black rail is a federal species of concern and is listed as state threatened. No critical habitat has been designated.

PROJECT SITE OCCURRENCE. This species nests and forages in tidal emergent marshes with pickleweed and cordgrass. According to CNDDB records, there are18 occurrence records within the selected project quads.

SPECIES ACCOUNT. The California black rail is a year-round resident in the greater Bay Area. They are elusive birds and are more likely heard than seen. They are the smallest of the rails, about 5-6 inches in length. The species occurs in the higher elevation zones of tidal

salt marsh heavily vegetated with pickleweed, and freshwater and brackish marshes. These rails are strongly associated with areas of active tidal influence and avoid diked bayland areas that might contain stagnant water (Shuford 1993). Their nests are platforms in grasses or pickleweed that are generally as close to the ground as possible while staying above high tide; the nests are well-concealed from the sides and from above.

The California black rail has been reported throughout eastern Marin County (CDFG 2010c), within the vicinity of several of the work sites. As such, the California black rail is considered to be moderately likely to occur within or adjacent to these work sites.

POSSIBLE IMPACTS. The most likely impact to California black rail is noise disturbance from maintenance activities. Sediment removal at approximately 15 sites may directly impact pickleweed and other salt marsh vegetation.

Northern spotted owl (*Strix occidentalis caurina*)

STATUS**.** The northern spotted owl is a federal threatened species; critical habitat has been designated, but there is no designated habitat in Marin County.

PROJECT SITE OCCURRENCE. This species prefers to nest in older growth redwood/Douglas fir forests. One project site (9-LAR-2) is within 250 ft of a known (past) territory on Larkspur Creek; 7 other territories are approximately 1/5 to 1/3 of a mile from project sites on Bothin, Ross, Warner Canyon, Arroyo Corte Madera del Presidio, Old Mill, and Reed Creeks. In most cases, the maintenance activities take place amidst residential development; with territories upslope of the creek and residential zone.

SPECIES ACCOUNT. The range of the spotted owl extends from southwest British Columbia through the Cascade Mountains, coastal ranges, and intervening forested lands in Washington, Oregon, and California, as far south as Marin County (USFWS 2010b). Spotted owls generally rely on older forested habitats because these forests contain the structural complexity, presence of deadwood and snags, high canopy closure and density characteristics required for nesting, roosting, and foraging, though foraging habitat may also include areas with less structural diversity and less canopy cover. In Marin County, the owls prefer Douglas-fir, and redwoods, but they also use Bishop pine and mixed evergreen-deciduous hardwood forests.

Local land agencies (MMWD, MCOSD, NPS) contract with the Point Reyes Bird Observatory to conduct yearly surveys for northern spotted owls; observations are submitted to CNDDB.

POSSIBLE IMPACTS. The most likely routine maintenance impact during the non-breeding season would be noise-related. To avoid impacts, maintenance activities should be scheduled to avoid the nesting season of February through July, or, if owls are detected during site reconnaissance, handtools should be used rather than power tools.

Raptors and Wading Birds

Special-status raptors that have potential to occur within or adjacent to the project site include northern harrier (*Circus cyaneus*), a state species of concern, and white-tailed kite

(*Elanus caeruleus*), a California Fully Protected Species and federal Special Concern Species. Northern harriers prefer marshy areas and are often seen along San Pablo Bay from Santa Venetia to Novato. They nest in Point Reyes and near the Petaluma River, mostly in grass or cattails in wet meadows, or near lakes and streams. White-tailed kites are tree nesters (nests are approximately 20 ft above the ground); the breeding population in Marin County is very low (Shuford 1993).
Burrowing owls (*Athene cunicularia hypugaea*), a federal and state species of special concern, nest in abandoned rodent burrows in areas of sparse vegetation, often on levees. They are not known at the sites, and there are no CNDDB occurrence records for burrowing owls on or near the sites.

Special-status water and wading birds that have potential to occur within or adjacent to the project site include the great egret (*Casmerodius albus*), great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and black-crowned night heron (*Nycticorax nycticorax*).
The great egret and great blue heron nest in rookeries in tall trees and secluded areas on marshes, such as Audubon Canyon Ranch at Bolinas Lagoon. The snowy egret and black-crowned night heron nest on West Marin Island, in San Pablo Bay offshore from San Rafael. Green herons (*Butorides virescens*) are known to occur within the project site.

POSSIBLE IMPACTS. The most likely routine maintenance impact during the non-breeding season would be noise-related. To avoid impacts, maintenance activities should be scheduled to avoid the nesting season of February through July, or, if owls are detected during site reconnaissance, handtools should be used rather than power tools.

Passerine and Non-passerine Landbirds

Nesting birds, their nests, and eggs are fully protected by the California Fish and Game Code (Sections 3503, 3503.5) and the Migratory Bird Treaty Act of 1918 (MBTA). The MBTA protects over 800 species, including geese, ducks, shorebirds, raptors, songbirds, and many relatively common species. Destruction or disturbance of a nest is a violation of these regulations and is considered a potentially significant impact. Nesting season is typically considered to extend from February 15th through August 31st in a particular year.

Special-status passerines and non-passerine landbirds that have potential to occur within or adjacent to the project site include saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), San Pablo song sparrow (*Melospiza melodia samuelis*), oak titmouse (*Baelophus inornatus*), and Nuttall's woodpecker (*Picoides nuttallii*).

In California, yellowthroats are found in freshwater marshes, coastal swales, swampy riparian thickets, brackish marshes, salt marshes, and the edges of disturbed weed fields and grasslands that border soggy habitats (Shuford 1993). In the San Francisco Bay region as a whole, about 60% of yellowthroats breed in brackish marsh, 20% in riparian woodland/swamp, 10% in freshwater marsh, 5% in salt marsh, and 5% in upland vegetation (Hobson *et al.* 1986, Shuford 1993). While a year round resident of Marin County, they are not known to breed in or near the project sites.

San Pablo song sparrows prefer tidal salt marshes with pickleweed. They make nest cups either in depressions on the ground or up to 3 ft high in vegetation; these nests may be on

ditch banks. There are several CNDDB records ranging from Novato Creek to Arroyo Corte Madera del Presidio.

Oak titmouse, a year-long resident of Marin County, prefers dry, open oak woodlands. They are cavity nesters; nests are normally 3-32 ft above the ground.

Nuttall's woodpecker prefers willow riparian and oak woodlands that are generally more open than dense; they nest in tree cavities in dead limbs or trunks, usually 3-45 ft above the ground.

POSSIBLE IMPACTS. The most likely routine maintenance impact during the non-breeding season would be noise-related. To avoid impacts, maintenance activities should be scheduled to avoid the nesting season of February through July, or, if nests are detected during site reconnaissance, handtools should be used rather than power tools.

Mammals

Salt marsh harvest mouse (*Reithrodontomys raviventris*)

STATUS**.** Salt marsh harvest mouse is a federal and state listed endangered species. Critical habitat has not been designated for this species.

PROJECT SITE OCCURRENCE. This species is found in saline emergent marsh with dense pickleweed. It is reported to occur within the project site in eastern Marin County. Lower reaches of Novato Creek levees, Gallinas Creek South Fork, Bothin Marsh sites. CNDDB contains 12 records in Petaluma River, San Rafael, and San Quentin quads.

SPECIES ACCOUNT. The harvest mouse is a rodent endemic to the salt and brackish marshes of the San Francisco Bay Estuary and adjacent tidally influenced areas. The harvest mouse typically weighs about 0.35 ounce with body length ranging from 2.7-2.9 inches. They depend mainly on dense pickleweed (*Sarcocornia pacifica*) as their primary cover and food source. However, harvest mice may utilize a broader source of food and cover which includes saltgrass (*Distichlis spicata*) and other vegetation typically found in the salt and brackish marshes of this region. In natural systems, harvest mice can be found in the middle tidal marsh and upland transition zones. Upland refugia is an essential habitat component during high tide events. The split of the northern (*R. raviventris halicoetes*) and southern (*R. raviventris raviventris*) subspecies occurs in Marin County around Point Pedro, with the northern subspecies in Novato and Santa Venetia, and the southern subspecies in Corte Madera and Richardson Bay marshes.

POSSIBLE IMPACTS. The most likely impact to salt marsh harvest mouse is noise disturbance from maintenance activities. Sediment removal at approximately 15 sites may directly impact pickleweed and other salt marsh vegetation.

Special-Status Bats

There are 24 known species of bats in California, all of which are protected under CDFG Code 4150 as indigenous, non-game mammal species. Each of these species use mature trees, snags, crevices and/or man-made structures such as buildings or bridges for roosting. Bats are site faithful and will not abandon an established roosting area unless disturbed.

Hibernation and roosting areas depend on the location of the roost and the species; potential roosting areas in the vicinity of project components include mature trees, snags and crevices within rock faces. Most of these species are ubiquitous in a variety of habitats, although not in large numbers. However, they often require species-specific roost requirements in terms of temperature, humidity, access, dimensions and height of the roosting area from the ground.

The pallid bat (*Antrozous pallidus*), a California Species of Special Concern, is a bridge-roosting bat species that is considered to have some potential to occur within the project site, due to the presence of bridges at several of the work sites. The species ranges from British Columbia and Montana to central Mexico, and east to Texas, Oklahoma and Kansas in habitats ranging from rocky arid deserts to grasslands into higher elevation coniferous forests. Pallid bats are gregarious, and often roost in colonies up to several hundred individuals. Pregnant females gather in summer maternity colonies within warm rock crevices, abandoned mines, caves, hollow trees and in cavern-like building features (e.g. attics). Females give birth between May and July. Young are generally weaned in mid to late August. Maternity colonies disband between August and October. The bats are relatively inactive during the winter and are not known to migrate. Pallid bats roost in rock crevices, tree hollows, mines, caves, and a variety of anthropogenic structures, including vacant and occupied buildings. Tree roosting has been documented in large conifer snags (e.g. ponderosa pine), inside basal hollows of redwoods and giant sequoias, and bole cavities in oaks. They are primarily insectivorous, feeding on large prey taken on the ground, or sometimes in flight.

Townsend's western big-eared bat (*Plecotus townsendii townsendii*) is a federal and state Species of Special Concern. The species occurs in humid habitats throughout the west, and is distributed from British Columbia south along the Pacific coast to central Mexico and east into the Great Plains. It has been reported in a wide variety of habitat types including mixed forests, riparian communities, agricultural areas, and coastal habitats. Distribution is strongly correlated with the availability of caves and cave-like roosting habitat, with population centers occurring in areas dominated by exposed, cavity forming rock and/or historic mining districts. Summer maternity colonies range in size from a few dozen to several hundred individuals. Maternity colonies form between March and June (based on local climactic factors), with a single pup born between May and July. Males remain solitary during the maternity period. Winter hibernating colonies are composed of mixed-sexed groups which can range in size from a single individual to colonies of several hundred animals. Mating generally takes place between October and February in both migratory sites and hibernacula. Its habit of roosting on open surfaces makes it readily detectable, and it is often the species most frequently observed (commonly in low numbers) in caves and abandoned mines throughout its range. It has also been reported to utilize buildings, bridges, rock crevices and hollow trees as roost sites. Foraging associations include: edge habitats along streams and areas adjacent to and within a variety of wooded habitats. It often travels large distances while foraging, including movements of over 10 miles during a single evening. It is a moth specialist with over 90% of its diet composed of lepidopterans.

Additionally, four tree-roosting myotis bat species are also considered to have some potential to occur within the project site due the presence of suitable tree and riparian

habitat. These species include long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), and Yuma myotis (*Myotis yumanensis*), all Federal Species of Concern. Most of these species utilizes tree cavities, hollows in tree snags, and exfoliating bark. The long-eared myotis will also roost under bridges. Fringed, long-eared, and long-legged myotis bats are less likely to be present in marsh/riparian vegetation (such as that which occurs in the proposed project site) and more likely to be found in mixed hardwood conifer/conifer habitat at higher elevations.

The Western red bat (*Lasiurus blossevillii),* a species of concern by the California Department of Fish and Game, roosts in riparian vegetation in Marin County.

There is potential for the pallid bat, Townsend's western big-eared bat, and Yuma myotis bat to roost in culverts; however, the culverts within the proposed project sites are generally too smooth in texture to be suitable habitat for these bat species.

Pallid bat has been reported near the upper reaches of Lagunitas Creek (CDFG 2011), within one mile of some of the work sites. Given the known presence of these bat species in the region and the presence of suitable habitat at several of the work sites, these and several other bat species are considered to have a moderate potential to occur within or adjacent to these work sites.

POSSIBLE IMPACTS: Bats may be disturbed by noise during vegetation maintenance activities, and their nesting and roosting areas may be destroyed by vegetation removal activities (of standing dead trees and/or invasive species).

3.3 Wildlife Movement Corridors and Habitat Fragmentation

The ability of wildlife to move through the landscape is important for migration (seasonal breeding and feeding), dispersal (new home ranges and long-term genetic exchange), and for daily movement within individual territories.

Habitat fragmentation creates a greater number of habitat patches that are smaller in size than the original contiguous habitat. This, in turn, can hinder regional wildlife movements, put stress on local populations, and increase the probability of extinction for these populations compared to those associated with non-fragmented landscapes. Considering the impacts resulting in potential fragmentation of primary habitat types and loss of valuable dispersal corridors is important when assessing the biological impacts of a project.

Because the activities proposed do not involve the loss of wetland and/or riparian habitat within the work sites, they are not likely to affect wildlife movement corridors or contribute to habitat fragmentation. Given that the proposed work is maintenance-related, the project will likely only result in short-term temporal impacts (1-2 days) to movement for aquatic species dependent the subject habitats. Movement through these areas will be restored as soon as maintenance activities are completed.

3.4 Sensitive Natural Communities

Sensitive natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection (*i.e.,* §404 of the Clean Water Act and/or the §§1600 *et seq.* of the California Fish and Game Code).

Within the project sites, two sensitive natural communities have the potential to be affected by project activities: northern coastal salt marsh and coastal brackish marsh (CDFG 2011). These communities are found within or adjacent to some of the project sites and are expected to fall under federal and/or state jurisdictions as wetlands or waters of the U.S. or waters of the state.

3.5 Wetlands and Other Waters of the U.S.

Wetlands and other aquatic resources such as riparian areas and certain aquatic vegetation communities are considered sensitive biological resources and can fall under the jurisdiction of several regulatory agencies. For a longer discussion of jurisdictional waters, please see Section 6.0

Wetlands are generally defined by the USACE as "those areas that are inundated or saturated by surface or ground water… that under normal circumstances support a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 [b]). Indicators of three wetland parameters determined by field investigation must be present for a site to be classified as a wetland by the USACE; these are hydric soils, hydrophytic vegetation, and wetlands hydrology.

Approximately 17 sites have been initially identified as possibly meeting the USACE definition of wetlands. A formal wetlands delineation for those sites will be completed in before seeking USACE permits. The following paragraphs set out the process which will be used to make the determinations.

Hydrophytic Vegetation

Hydrophytic vegetation includes those plant species that possess physiological features or reproductive adaptations that allow them to persist in soils subject to prolonged inundation and anaerobic soil conditions. Plant species are classified by their probability of being associated with wetlands or uplands. Obligate (OBL) species almost always (>99% of the time) occur in wetlands. Facultative Wetland (FACW) species occur in wetlands 67-99% of the time. Facultative (FAC) species have an equal probability 33-66% to occur in wetlands. Facultative Upland (FACU) and Obligate Upland (UPL) species occur in wetlands 1-33% and <1% of the time, respectively. A project site will meet this criterion if more than 50 percent of the dominant plant species in each of the strata are OBL, FACW, or FAC indicator species. Table 1 lists common wetland plant species and their indicator status.

Table 1.
Wetland Indicator Status of Common Plant Species
Detected Within and Adjacent to Potential Wetlands

Scientific Name	*Common Name*	*Indicator Status*
Alnus rubra	red alder	FACW
Athyrium felix-femina var.*cyclosorum*	lady fern	FAC
Atriplex patula	spearscale	FACW
Baccharis douglasii	herb	OBL
Cotula coronopifolia[1]	African brass-buttons	FACW+
Distichlis spicata	saltgrass	FACW
Epilobium ciliatum ssp. *ciliatum*	northern willow herb	FACW
Frankenia salina	alkali heath	FACW-
Grindelia stricta	marsh gum-plant	FACW
Holcus lanatus[1]	velvet grass	FAC
Jaumea carnosa	jaumea	OBL
Juncus balticus	wire rush	OBL
Juncus effusus	common rush	OBL
Juncus xiphioides	iris-leaf rush	OBL
Mentha piperata[1]	peppermint	OBL
Mentha pulegium[1]	pennyroyal	OBL
Mimulus guttatus	common large monkey-flower	OBL
Picris echioides[1]	bristly ox-tongue	FAC*
Polygonum punctatum	water smartweed	OBL
Polypogon monspeliensis[1]	rabbitfoot grass	FACW+
Potentilla anserina ssp. *pacifica*	silverweed	OBL
Rubus discolor[1]	Himalayan blackberry	FACW*
Rubus parviflorus	thimbleberry	FAC+
Rubus ursinus	California blackberry	FACW*
Rumex crispus[1]	curly dock	FACW-
Rorippa nasturtium-aquaticum	watercress	OBL
Salicornia virginica	pickleweed	OBL
Salix lasiolepis	arroyo willow	FACW
Salix lucida var. *lasiandra*	lance-leaf willow	OBL
Scirpus microcarpus	small-headed rush	OBL
Scirpus robustus	prairie bulrush	OBL
Stachys chamissonis	coast hedge-nettle	OBL
Typha angustifolia	narrow-leaf cattail	OBL
Typha latifolia	broad-leaf cattail	OBL
Urtica dioica ssp. *holosericea*	hoary nettle	FACW
Veronica anagallis-aquatica[1]	water speedwell	OBL

[1] indicates non-native species

Soils

A list of soil units mapped within the work sites and supporting potentially jurisdictional wetlands or other waters is presented in Table 2. Soils are indicated where listed as hydric in Marin County (USDA 1985).

Table 2. Soils Mapped at the Work Sites

Map Series Name	Unit and Phase	Hydric
Ballard-Urban Land Complex	0 - 9% slopes	Yes, drainageways
Blucher-Cole Complex	2 - 5% slopes	Yes, alluvial fans
Bressa Variant-Mcmullin Variant Complex	30 - 50% slopes	No
Cortina Gravelly Sandy Loam	0 - 5% slopes	Yes, depressions
Cronkhite-Barnabe Complex	15 - 30% slopes	No
Cronkhite-Barnabe Complex	30 - 50% slopes	No
Cronkhite-Barnabe Complex	50 - 75% slopes	No
Dipsea-Barnabe Very Gravelly Loams	50 - 75% slopes	No
Dipsea-Urban Land-Barnabe Complex	30 - 50% slopes	No
Dune Land	Dune land	Yes, basin floors
Los Osos-Bonnydoon Complex	30 - 50% slopes	No
Los Osos-Urban Land-Bonnydoon Complex	15 - 30% slopes	No
Maymen-Maymen Variant Gravelly Loams	30 - 75% slopes	No
Novato Clay	Novato clay	Yes, tidal marshes
Pits, Quarries	Pits, quarries	Yes, flood plains
Reyes Clay	Reyes clay	Yes, drainageways
Rock Outcrop-Xerorthents Complex	50 - 75% slopes	No
Saurin-Bonnydoon Complex	30 - 50% slopes	No
Saurin-Bonnydoon Complex	50 - 75% slopes	No
Saurin-Urban Land-Bonnydoon Complex	15 - 30% slopes	No
Saurin-Urban Land-Bonnydoon Complex	30 - 50% slopes	No
Tocaloma-Mcmullin Complex	15 - 30% slopes	No
Tocaloma-Mcmullin Complex	30 - 50% slopes	No
Tocaloma-Mcmullin Complex	50 - 75% slopes	No
Tocaloma-Mcmullin-Urban Land Complex	15 - 30% slopes	No
Tocaloma-Mcmullin-Urban Land Complex	30 - 50% slopes	No
Tocaloma-Saurin Association	Extremely steep	Yes, depressions
Tocaloma-Saurin Association	Steep	No
Tocaloma-Saurin Association	Very steep	Yes, depressions
Urban Land-Ballard Complex	0 - 9% slopes	Yes, tidal flats
Urban Land-Xerorthents Complex	0 - 9% slopes	Yes, tidal flats
Water	Water	No
Xerorthents, Fill		No
Xerorthents-Urban Land Complex	0 - 9% slopes	Yes, tidal flats

Hydrology

Surface hydrology within the study corridor is influenced by direct precipitation, headwater flows, backwater flooding, sheet flow, surface seepage due to a high water table, the presence of poorly drained soils, tidal fluctuation, and surface runoff from surrounding areas. Runoff from adjacent roadways also contributes to on-site hydrology.

Portions of the Eastern Marin project sites are immediately adjacent to San Pablo Bay. Several perennial streams, including Novato Creek, Corte Madera Creek, Coyote Creek, and Arroyo Corte Madera del Presidio flow into San Pablo Bay. In Western Marin, Easkoot Creek flows directly into the Pacific Ocean. Numerous unnamed intermittent tributaries flowing mostly eastward from their origins on Inverness Ridge are also present within many of the work sites.

Jurisdictional Determination

The CDFG exercises jurisdiction over wetland and riparian resources associated with rivers, streams, and lakes under California Fish and Game Code Sections 1600 to 1607. The CDFG has the authority to regulate work that will substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed. The CDFG's jurisdiction along a river, stream, creek, or other water body is usually bounded by the top-of-bank or the outermost edges of riparian vegetation.

Because all of the project sites are part of aquatic systems that ultimately flow into the Pacific Ocean, all of them are expected to fall under regulation of the CDFG and RWQCB as waters of the State.

4.0 AVOIDANCE AND MINIMIZATION MEASURES

4.1 General Measures

General avoidance and minimization measures apply to each site, regardless of maintenance activity type or special status species that may be present.

GEN-1: Designation of Environmental Compliance Coordinator

An Environmental Compliance Coordinator (ECC) will be designated. The ECC shall have an understanding of biological resources, missions of regulatory agencies and regulations as they may affect listed species, and the nature of the maintenance activities.

Before commencement of a maintenance activity, the ECC will review project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he will determine appropriate measures to implement, based on the type of activity, and will prescribe appropriate avoidance and minimization measures and general and activity-specific conditions and prohibitions.

GEN-2: Assessment, Buffers, and Stop Work Orders

The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC will coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work should not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e.USACE, USFWS, NMFS, and/or CDFG).

GEN-3: Contractor Crew Training

The ECC will ensure that before work starts, all on-site maintenance activity personnel and contractors will receive instruction regarding the presence and description of listed species at each project site and the details of appropriate avoidance and minimization measures.

GEN-4: Site Preparation/Wildlife Reconnaissance

The ECC shall walk the site each day before maintenance activities commence to locate wildlife; if any special status wildlife species are noted, work will not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

All habitat improvements on salmon and steelhead streams shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (CDFG 2010d).

GEN-5: Monitoring and Reporting Program

The ECC will implement a monitoring and reporting program that shall include, but not be limited to: preparing each year's project list, scheduling pre-construction surveys, overseeing project activity during maintenance, preparing photo documentation, and evaluating post-maintenance restoration/revegetation, if necessary. Reporting regarding project impacts to California red-legged frogs will be performed in accordance with the terms and conditions issued by the USFWS.

GEN-6: Work Windows

To avoid impacts to special status species, the maintenance activities carried out should typically occur during the summer low flow season. In addition, species-specific work windows should be followed to avoid impacts. Table 3 shows the work windows for species that may be impacted by the proposed maintenance activities. Additional information can be found within the species-specific AMMS.

Monarch butterfly

Monarch butterflies are known to overwinter in areas adjacent to the Easkoot Creek project area. The work window is April 1st through August 31st; work after September 1st requires more vigilance.

Salmon and steelhead

Work in and around salmon and steelhead streams is restricted to the period of June 15th to October 15th or the first rains. This is to take advantage of low stream flow and avoid the spawning and egg/alevin incubation period in the fall and the outmigration period in spring. Work in non-salmonid streams may be conducted between April 15th and October 15th in each calendar year.

Upslope work generally occurs during the same period as stream work. Sediment reduction activities are dependent on soil moisture content and, in some areas, equipment access and effectiveness are constrained by wet conditions. .

The permissible work window for individual work sites will be further constrained as necessary to avoid adverse impacts to special-status species and the nesting or breeding seasons for native fish, birds, amphibians and terrestrial mammals. (see mitigation measures for specific timing of maintenance activities, by species)

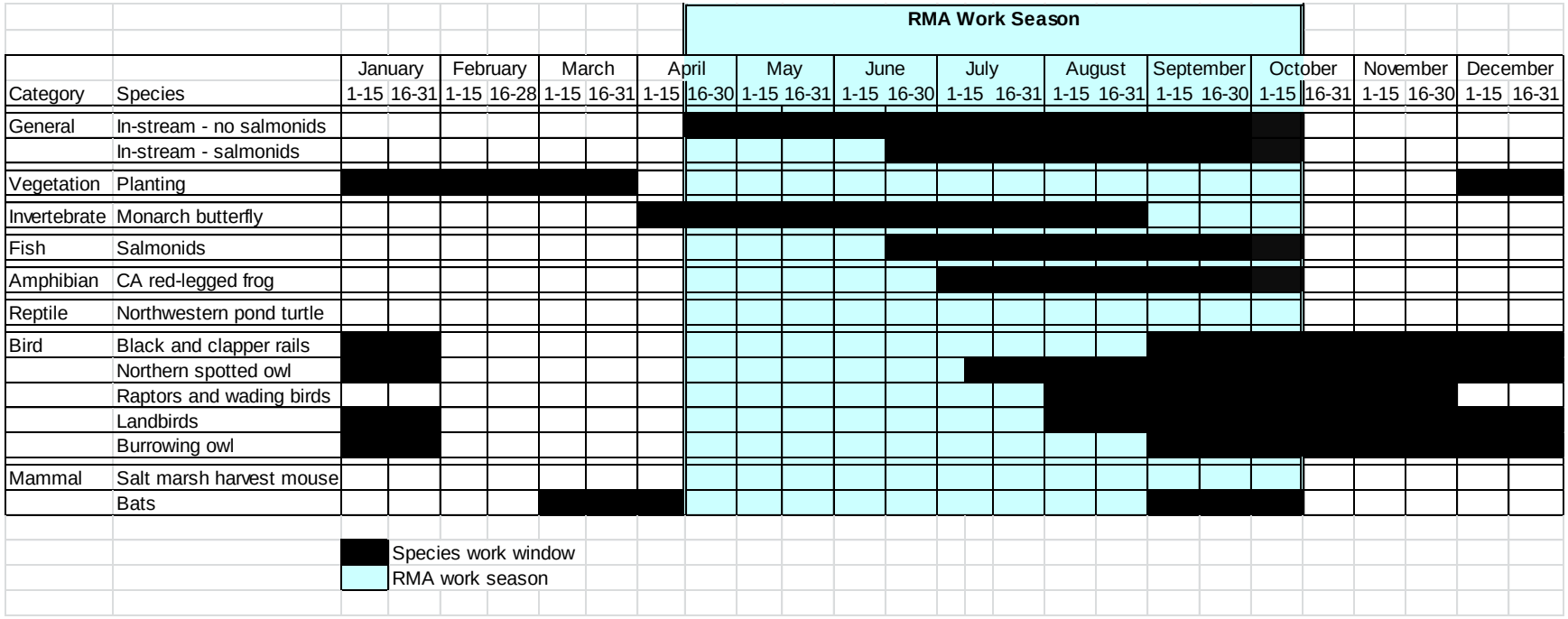
California Red-legged frog, northwestern pond turtle, and salt marsh harvest mouse

There are no work windows for these species; surveys may be required if species may be impacted. See species-specific AMMs for survey requirements.

California clapper and black rails

The work window for activities within rail habitat is September 1st through January 31st.

Table 3. Work Windows



Raptors, wading birds, and migratory birds

The work window for sites with potential for raptor and migratory bird nesting is August 1st through November 30th; therefore, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. However, if work in the riparian zone or mowing of levees will occur between before July 31st the ECC will conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC should postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

Because the culverts in the proposed project sites are fairly small, there is minimal likelihood that they would provide suitable habitat for swallows. However, if any culverts show evidence of past or current swallow nesting, the ECC will identify them and maintenance activities will occur after August 31st or after all swallows have fledged to avoid impacts.

Roosting bats

The work window for activities at sites where bats are determined to be present is from March 1st through April 15th and September 1st through October 15th.

GEN-7: Trash Removal

During all activities at project sites, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following maintenance activities, all trash and maintenance debris shall be removed from work sites and disposed of properly.

GEN-8: Equipment Staging

Staging/storage areas for equipment, materials, fuels, lubricants, and solvents, will be located outside of the stream's high water channel and associated riparian area. Stationary equipment such as motors, pumps, generators, compressors, and welders located within the dry portion of the steam channel or adjacent to the stream, will be positioned over drip-pans. Equipment will be moved out of the normal high water area of the stream prior to refueling and lubricating. The ECC or crew supervisor shall ensure that contamination of habitat does not occur during such operations. Best Management Practices covering Chemical Use (Spill Prevention and Control), contained in the BASMAA Flood Control Facility Maintenance Best Management Practices Manual (BAASMA 2000) will be followed. These BMPs are designed to prevent the discharge of chemicals to flood control channels and storm drain systems and allow prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

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 proposed activity.

GEN-9: Invasive Species

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.

For all activities in creeks and bay, all gear exposed to water should be allowed to dry for three days before being used again. Some disinfectants are OK to use per DFG and USFWS (users should check with those agencies). As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew will wash and dry them off-site prior to using them in another creek or tributary.

GEN-10: Water Quality

Any work using equipment within the stream channel shall be performed in isolation from the flowing stream. If there is any flow when the work is done, cofferdams should be constructed upstream and downstream of the excavation site to divert all flow from upstream of the upstream dam to downstream of the downstream dam. The cofferdams will be constructed with clean river gravel or sand bags and sealed with sheet plastic. Sand bags and any sheet plastic will be removed from the stream upon project completion. Clean river gravel may be left in the stream, but the cofferdams must be breached to return the stream flow to its natural channel.

For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures will be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a filter berm of clean river gravel, coir logs or their equivalent. Silt fences and other non-native materials will be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

Water quality will be protected through the use of sediment/erosion control measures, including sediment traps, turbidity curtains, silt fences, hay bales, hydro-seeding using a native mix, and use of seed-free straw mulch, as appropriate. These measures will be appropriately located to prevent transporting and depositing sediment disturbed during maintenance activities outside of the maintenance activity zone.

If it is necessary to divert flow around the work site, either by pump or by gravity flow, the suction end of the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997).

During dewatering, intakes and outlets of pumps should be designed to minimize turbidity and the potential to wash contaminants into the stream.

Any turbid water pumped from the work site itself to maintain it in a dewatered state shall be discharged in an upland location (e.g., vegetated upland area via flexible pipe) where it will be filtered before returning to the stream channel.

4.2 Avoidance and Minimization Measures for Plants

One avoidance and minimization measure covers listed and special status plants.

PLA-1: Special status plants

At sites where vegetation may be modified (such as mowing, clearing, or ground-breaking), and where special status plant species may potentially occur, a qualified biologist should conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000).

Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDB documenting the species and location.

The ECC shall ensure that the Project Foreman is aware of these site-specific conditions, and will inspect the work site before, during, and after completion of the maintenance activities.

4.3 Avoidance and Minimization Measures for Invertebrates

INV-1: Monarch butterfly

The three Easkoot Creek project sites are adjacent to known overwintering sites for Monarch butterfly.

Avoidance will be accomplished if maintenance activities are scheduled for April 1st through August 31st

If work occurs during the butterfly overwintering season (October through March), the ECC should walk the area of proposed activity each day before maintenance activities begin to determine presence monarchs. If none are observed, avoidance can be assumed and work can proceed. If monarchs are observed within the site, work should not commence until all individuals have left the work site on their own.

4.4 Avoidance and Minimization Measures for Fish

The AMMs described below is designed specifically for coho salmon and steelhead trout, as these species are known to occur within some of the project sites, but the measures will also protect other fish species such as Chinook salmon, sturgeon, lampreys, and Sacramento splittail. There are two project sites at Easkoot Creek that may have coho salmon and several project sites in Easkoot Creek and creeks within the Novato Creek and Richardson Bay watersheds with steelhead trout.

FISH-1: Salmonids

If coho or steelhead are known to be absent from the project site based on CEMAR/DFG survey and there are long-standing natural or artificial downstream barriers sufficient to prevent upstream migration, then avoidance has been accomplished and no further actions are necessary.

If coho or steelhead are determined or presumed to be present in the project site, then the following Avoidance and Minimization Measures shall be implemented:

- All in-stream maintenance activities will be restricted to the low-flow period of June 15th through October 15th. Work above the top of bank or outside of the channel will not be subject to this modified work period.

- No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified biologist.

- To minimize turbidity and stress to special status species, personnel will avoid walking through stream pools and thalwegs, and will instead walk across riffles or outside of the stream bed to access a project site.

- To minimize disturbance during sediment removal activities, if there is flow or seepage in a work site, a reach of creek may have to be de-watered. Before construction of the de-watering system, a qualified biologist with appropriate permit(s) will conduct fish relocation activities, and immediately release captured fish to a suitable habitat near the project site.

- Screens shall be placed on all pumps used for dewatering the work site in accordance with NOAA Fisheries' Fish Screening Criteria for Anadromous Salmonids (NMFS, 1997).

- If used, coffer dams should be constructed upstream of the entire work site within the stream banks, and should be constructed with clean river gravel or sand bags and sealed with sheet plastic.

- Intakes and outlets should be designed to minimize turbidity and the potential to wash contaminants into streams.

- Pump discharge must be directed into a settling basin to allow silt removal. Once the project work is complete, water should slowly released back into the creek to prevent erosion and limit turbidity.

4.5 Avoidance and Minimization Measures for Amphibians

AMPH-1: California red-legged frog (CRLF)

CRLF absence is presumed for all project sites in eastern Marin. Therefore, impacts are avoided, and no further surveys, studies or CRLF protection measures are required and the maintenance activities can proceed.

For the Easkoot Creek sites, 5-EAS-1, 5-EAS-2 and 5-EAS-3, where there is potential for California red-legged frog to occur, pre-construction aquatic surveys should be conducted by a qualified biologist prior to the onset of any disturbance related activities, following the protocol outlined in the Revised Guidelines on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005):

- Pre-construction surveys should consist of two separate daytime and nighttime surveys extending 300 ft upstream and downstream (where feasible) of the proposed work sites. If special-status species are found, CDFG and/or USFWS should be contacted to determine what actions are to be taken. The 2005 Guidance recommends a total of up to eight (8) surveys to determine the presence of CRLF at or near a project site. Two (2) day surveys and four (4) night surveys are recommended during the breeding season; one (1) day and one (1) night survey is recommended during the non-breeding season. Each survey must take place at least seven (7) days apart. At least one survey must be conducted prior to August 15th. The survey period must be over a minimum period of 6 weeks (i.e., the time between the first and last survey must be at least 6 weeks). Throughout the species' range, the non-breeding season is defined as between July 1st and September 30th.

- If California red-legged frogs, tadpoles, or eggs are found, the appropriate state and federal agencies will be contacted to determine what actions should be taken. If the USFWS approves the moving of animals, the ECC shall be allowed sufficient time to move CRLF from the work site before maintenance activities begin. The USFWS should be contacted during the permitting phase to determine if additional measures would be required.

- The project sponsor shall designate a person, which may or may not be the ECC, to monitor on-site compliance as long as that individual has undergone training in CRLF identification. The monitor shall coordinate with the contractor to halt any action that

might result in more than incidental take of CRLF. If work is stopped, the Corps and USFWS shall be notified immediately by the ECC.

- If a maintenance activity site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh no larger than five millimeters to prevent CRLF from entering the pump system.

- A biological monitor should on site to oversee aspects of the project that disturbs CRLF habitat, e.g. disturbance of aquatic vegetation.

- Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of red-legged frogs, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

4.6 Avoidance and Minimization Measures for Reptiles

REP-1: Northwestern pond turtle

Several sites may contain suitable habitat for northwestern pond turtle, and they have been known to occur at sites 1-ASJ-1, 1-LYC, and 1-WAR-2

Pre-construction surveys for northwestern pond turtle should be conducted by a qualified biologist in accordance with USFWS protocols within 72 hours of the start of maintenance. The creek should be surveyed for presence of turtles and the creek banks surveyed for presence of burrows; all locations of observed turtles and burrows should be noted.

Each day, before maintenance activities begin, the ECC should make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, the ECC should use any means necessary to avoid "take" of these species, including hand removal, installation of fencing, or other measures. The ECC should assess the likelihood of project impacts to these species and coordinate findings with the USFWS and CDFG to ensure that appropriate protective measures are applied.

At any time during maintenance activities, if a northwestern pond turtle is observed by the ECC, maintenance crew, or other knowledgeable persons, maintenance activities should stop to avert the avoidable take of these species.

All staging areas for all heavy equipment, storage of materials, and any maintenance/fueling of heavy equipment should be clearly identified on the grading and building plans in order to minimize impacts to upland habitats outside the project site.

Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of northwestern pond turtles, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

4.7 Avoidance and Minimization Measures for Birds

Following are avoidance and minimization measures for birds. Some of these relate directly to listed species with the potential to occur within one or more project sites (the rails, northern spotted owl); however, others relate more generally to a class of species, such as raptors and wading birds and land birds.

BIRD-1: California clapper rail and California black rail

Several of the sites are within (5-10 sites) or immediately adjacent (15-20 sites) to suitable habitat for California clapper rail and California black rails. The following measures apply to all sites in or near salt or brackish marshland and will also serve to protect other tidal-marsh dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

When working within 250 ft of salt or brackish marshland during the period February 1st through August 31st, presence for either rail species should be assumed.

For all maintenance activities except for mowing of levees:

Maintenance activities should be scheduled to occur between September 1st and January 31st to avoid the rail breeding season.

Work should be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active.

Work should be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work should occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.

Activities should proceed as quickly as possible to reduce disturbance from noise, dust, etc.

Removal or disturbance of emergent tidal marsh vegetation should be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface should be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If removal is necessary, the work should be scheduled outside of the breeding season (February 1 – August 31st); all vegetation should be removed by hand, and should be salvaged and retained for replacement after work is completed.

If, for any reason other than fire fuel reduction levee mowing, the District must perform maintenance activities within 250 ft of salt or brackish marshland during the rail breeding season, the District will retain a qualified biologist to conduct clapper rail surveys in accordance to most currently available protocols from the Department of Fish and Game and the US Fish and Wildlife Service.

For fire fuel reduction mowing on levee crowns

Mowing of levees for fire fuel reduction and access to facilities normally occurs during the rail breeding season (usually before July 1st). For all mowing activities, a biological monitor should first walk the entire site to determine presence of any rails and/or rail nests. If rails and/or nests are observed, work should not be allowed to proceed until the following steps are followed: if nests are observed, work should not proceed and should be rescheduled for after young have fledged; if rails are observed but not nests, the birds should be allowed to leave the area on their own before work begins.

If no rails or nests are detected, the biological monitor should walk in front of the mower as work proceeds and ensure that all Avoidance and Minimization Measures are implemented and documented.

When mowing on levees within 250 ft of salt or brackish tidal marshlands, work should be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active. Mowing activities should proceed quickly within an area to reduce disturbance from noise, dust, etc. Mowing of levees within 250 ft of salt or brackish tidal marsh habitat will only occur on the tops of the levees and not on the side-slopes down into the marsh.

In addition, work should be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work should occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.

BIRD-2: Northern Spotted Owl

Per the "2011 Protocol for Surveying Proposed Management Activities that May Affect Northern Spotted Owls", project sites for activities that do not modify spotted owl habitat but may cause disturbance to spotted owls (such as noise from weed-whackers) are defined as 0.25 mi buffers of project footprints. Several of the work sites are within 0.25 mi (1320 ft) of known locations of northern spotted owl activity centers on Old Mill Creek, Cascade Creek, Warner Canyon Creek, Bothin Creek, Larkspur Creek, and Ross Creek (sites 3-OMC; 3-CAS; 3-WAR; 9-BOTH; 9-LAR-2; and 9-ROS).

To avoid impacts to breeding northern spotted owls, maintenance activities at sites adjacent to habitat for northern spotted owl should follow a limited operating period (LOP) with no vegetation maintenance scheduled from February 1st through July 9th. Disturbance can also be minimized by the use of non-motorized hand tools.

If a biological evaluation determines that vegetation projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location, or where a biological evaluation determines that topographic features may shield nest sites, the LOP may be waived or the buffer distance modified.

BIRD-3: Raptors and wading birds

Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them should be minimized.

Burrowing owls, a federal and state species of special concern, are not known at the sites, and there are no CNDDB occurrence records for burrowing owls on or near the sites. However, if burrowing owls and/or if signs are found, then guidelines as detailed in the DFG 2012 Staff Report on Burrowing Owl Mitigation should be followed.

If work is scheduled to occur between August 31 – January 31 after the nesting season, then avoidance has been achieved and work can proceed; however, to protect late- or second-nesters, the ECC should walk the site before work occurs to check for nests and presence of birds at the work site.

If work in the riparian zone or mowing on levees will occur before July 31st, the ECC should conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

During nesting season, (February 1st - September 1st), the ECC should walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

BIRD-4: Landbirds

Many of the project sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. These project sites include: 1-NOV-3, 3-ACMP-3, 3-NYH-2, 5-EAS-1, 5-EAS-2, 9-CMC-4, and many more.

Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would violate the federal Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game (CDFG) Code.

Avoidance will be achieved if maintenance activities are scheduled for August 1st to January 31st to avoid the nesting season (February 1st - July 31st).

If maintenance activities are scheduled during the nesting season, then the following AMMs should be followed:

- The removal of any trees or shrubs should occur in August, after the nesting season. If removal of trees or shrubs occurs, or maintenance begins between February 1st and July 31st (includes nesting season for passerine or non-passerine birds, and raptors), a nesting bird survey should be performed by a qualified biologist within 14 days prior to the removal or disturbance of potential nesting trees or shrubs.

- If work in the riparian zone or mowing on levees will occur before July 31st, the ECC should conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

- All trees with active nests should be flagged and a non-disturbance buffer zone should be established around the nesting tree, or the site should be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft for passerines and non-passerine land birds. Active nests should be monitored by a qualified biologist to determine when the young have fledged and are feeding on their own.

- In addition to surveying trees and shrubs for nesting birds, surveys should be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within 14 days prior to the commencement of project related activities by a qualified biologist.

- The ECC should be present at the commencement of maintenance-related activities to ensure that nesting birds and sensitive bird species have not inhabited the project site during the window following pre-construction surveys and commencement of maintenance activities. The ECC should also review all staging areas to ensure nesting and special status birds are not present.

- Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of sensitive habitat and bird species, and inform them of when work needs to be stopped and appropriate officials informed of species presence. .

4.8 Avoidance and Minimization Measures for Mammals

There is only one listed mammal in the project quad maps; and the mammals on the species of concern list are all bat species. AMMs for mammals are below.

MAMM-1: Salt Marsh Harvest Mouse (SMHM)

The majority of the sites are not in, nor adjacent to, salt marsh harvest mouse habitat; avoidance has been achieved for those sites.

For sites where work includes removal of pickleweed or may otherwise impact salt marsh harvest mouse habitat, the following AMMS should be followed:

- When implementing maintenance activities in uplands adjacent to salt or brackish marshland, vehicles will be confined to existing roads where possible, and disturbed areas should be revegetated with brackish marsh species. Crews will use matting, pontoon boards or other comparable methods whenever feasible to minimize impacts to the existing vegetation. The placement of mats will be verified by a qualified biologist before their placement to minimize habitat impacts. Crews will work exclusively from mat boards and boardwalks to minimize trampling of vegetation. A qualified biologist will be available during the course of the maintenance work.

- If maintenance activities are conducted outside the breeding season, in coordination with USFWS and CDFG, a qualified biologist should conduct a pre-construction survey within 5 days of the start of maintenance activities to check for presence of mice within the project sites. In addition, a biological monitor should be present during maintenance-related activities along and adjacent to all suitable nesting habitat areas to ensure that salt marsh harvest mice are not present.

- Work should be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for SMHM.

- Removal or disturbance of emergent tidal marsh vegetation should be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface should be avoided to provide a buffer of refugial habitat within as wide a swath as possible.

- Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of the salt marsh harvest mouse and its habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

- For project sites where work will intrude into tidal marsh habitat, a qualified biologist should survey the site prior to beginning work in order to determine the presence/absence of SMHM, and the following measures should be implemented:

- Under the supervision of the qualified biologist, vegetation should be removed only with non-mechanized hand tools; no motorized equipment should be used. Vegetation removal may begin only when no mice are observed, or with DFG approval, and shall start at the edge farthest from the salt marsh and work its way towards the salt marsh. If a mouse of any species is observed within the areas being removed of vegetation, work should stop and DFG should be notified. Unless otherwise approved by DFG, the mouse shall be allowed to leave on its own volition. Removal of pickleweed will generally follow Zedler (2001).

- If trenching takes place within 50 ft of pickleweed areas, visqueen fencing should be installed around worksites within pickleweed before excavation activities begin.

DFG will approve the size and placement of fencing. An escape ramp should be placed in any open trench at the end of the day to allow any entrapped animals to escape.

- A biological monitor should be on-site who will have the authority to halt project activities in order to comply with these terms.

MAMM-2: Roosting bats

Some of the sites may be within or adjacent to suitable habitat for roosting bats.

Pre-construction surveys for roosting bats should be conducted concurrent with those for land birds. If surveys occur during the daytime, the biologist should look for presence of bat droppings at likely roost sites (under bridges and trees (in layers of bark, woodpecker holes, and hollow branches). The droppings are black and small, about 4 – 8 mm long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software.

If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed.

If bats were detected during the pre-construction survey, and removal of trees, shrubs, or dense ivy is scheduled to occur during bat breeding season, a qualified biologist should conduct a bat presence-absence survey. If bats are detected, work should be re-scheduled to occur within these dates: March 1st – April 15th and/or September 1st – October 15th in order to avoid the breeding season. Removal of vegetation should follow the two-phased removal system: Day 1, in the afternoon, limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures would be avoided, and only branches or limbs with those features would be removed. Day 2: the entire tree would be removed.

Training sessions should be given to all workers during bat breeding season to inform them of protective measures, details about the two-phase tree removal protocol, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

5.0 SITE-SPECIFIC ANALYSIS

Following is an analysis for each of the 95 project sites describing the site, listing the existing vegetation communities and wildlife habitats, noting the potential extent of jurisdictional wetlands or waters, listing potentially occurring special status species, and referencing appropriate avoidance and minimization measures (AMMs) and best management practices (BMPs).

The potential for special-status wildlife species to occur within or immediately adjacent to each individual project site is in most cases based on the presence of suitable habitat or the known presence of a species within the vicinity of the work site. Therefore, within the following site-specific analysis, unless otherwise noted, those species that are listed for each work site are considered to have at least some potential to occur within the work site.

See Appendix D in Programmatic Approach to Routine Flood Control Maintenance Activities document for the Site Fact Sheets.

6.0 PERMITTING IMPLICATIONS

Several state and federal regulatory agencies have jurisdiction over sensitive biological resources such as riparian areas, wetlands, waters of the United States, waters of the State, and special-status species and natural communities. Depending on the extent and type of impacts, project activities often require federal, state, and/or local permits. However, at the discretion of the lead agency in the CEQA review process, prior to the issuance of any permit for actions that would result in impacts to wetlands, waters, special-status species, or sensitive vegetation communities, notification to all or some of the following agencies is likely to be required:

Federal Jurisdiction – United States Army Corps of Engineers (USACE)

The USACE has primary federal responsibility for administering regulations that concern "waters of the U.S." within the project sites. Waters of the United States include: 1) all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide; 2) all interstate waters including interstate wetlands; 3) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, wetlands, sloughs, vernal pools, wet meadows, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; 4) tributaries of the above; and 5) territorial seas.

The USACE acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in "Navigable Waters of the U.S.;" and the Clean Water Act Section 404, which governs specified activities in "other waters of the United States" including wetlands. The USACE requires that a permit be obtained if a project proposes placing structures within, over, or under navigable waters and/or discharging dredged or fill material into "waters of the U.S." below the ordinary high-water mark in non-tidal waters. The Environmental Protection Agency (EPA), United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Services (NMFS), and several other agencies provide comment on USACE permit applications.

For jurisdictional purposes, Section 404 defines wetlands as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support (and do support, under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 Code of Federal Regulations [CFR] 328.3[b] and 40 CFR 230.3). The federal definition of wetlands requires three wetland identification parameters to be present: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands include freshwater marsh, seasonal wetlands, and vernal pool complexes that have a hydrologic link to “other waters of the U.S”.

"Other waters of the U.S." refers to hydric features that are regulated by the Clean Water Act but are not wetlands (33 CFR 328.4). To be considered jurisdictional, these features must exhibit a defined bed and bank and an ordinary high-water mark. Examples include rivers, creeks, intermittent and ephemeral channels, ponds, and lakes. Wet areas that are *not*

regulated under the Clean Water Act would include stock watering ponds, agricultural ditches created in upland areas, and isolated wetlands that do not have a hydrologic link to other waters of the U.S.

While the USACE is the responsible agency for regulating wetlands under Section 404 of the Clean Water Act, the EPA has overall responsibility for the Act. The USACE has the option to issue a permit on a case-by-case basis (individual permit) or at a program level (general permit). Nationwide permits (NWPs) are an example of general permits; they cover specific activities that generally have minimal environmental effects. Activities covered under a particular NWP must fulfill several general and specific conditions, as defined by the NWP. If a proposed Project cannot meet these conditions, an individual permit may be required.

For residential, commercial, and institutional development projects a standard Individual Permit is required if there are discharges that will result in the fill of any tidal waters or wetlands; or impacts to more than one-half acre of non-tidal waters or wetlands, and/or impacts to greater than 300 linear ft of non-tidal waters or wetlands, including creeks (either perennial intermittent or ephemeral), arroyos or vegetated and unvegetated tributaries.

In contrast, projects that result in impacts of less than one-half acre and/or less than 300 linear ft may be authorized under one of the existing NWPs if they meet all of the NWP General Conditions.

Regardless of the permits required, careful project design and efforts to avoid and minimize impacts to special-status species and wetland resources will streamline the permitting process and significantly improve the likelihood of rapid project approval.

Federal Jurisdiction - United States Fish and Wildlife Service (USFWS)

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 USC 1533[c]). Pursuant to the requirements of FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species could be present in the project site and determine whether the proposed project would have a potentially significant impact on such species. FESA prohibits "take" of federally-listed Threatened or Endangered wildlife species. The FESA defines "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or attempt to engage in any such conduct" 16 U.S.C. §1532(19). The FESA requires that actions authorized, funded or carried out by federal agencies do not jeopardize the continued existence of a federally-listed species or adversely modify designated Critical Habitat for such species. If a federal agency determines that a proposed federal action (i.e., issuance of a Clean Water Act Section 404 permit for wetland fill) "may affect" a listed species and/or designated Critical Habitat, the agency must consult with the USFWS and/or NMFS for protected marine and anadromous fish species in accordance with Section 7 of the FESA. If take of a federally-listed species may occur, the applicant may be required to obtain an Incidental Take Permit from the USFWS. Such take authorization is available through the Section 7 consultation process for projects involving a federal action, or through the Section

10 process (requiring development of a Habitat Conservation Plan) for other projects. The Incidental Take Permit allows taking of federally-listed species if the take is "incidental to and not the purpose of, the carrying out of an otherwise lawful activity" 16 U.S.C. §1539(a)(1)(B).

The USWFS also affords protection to migratory birds through the Migratory Bird Treaty Act (MBTA). The MBTA protects all resident and migratory wild birds found in the United States, except the house sparrow, starling, feral pigeon, and resident game birds. Resident game birds are managed separately by each state. The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import or export any migratory bird including feathers, parts, nests or eggs.

State Jurisdiction - California Department of Fish and Game (CDFG)

CDFG is authorized under the California Fish and Game Code, Sections 1600-1607 to develop mitigation measures and enter into Streambed Alteration Agreements with applicants who propose projects that would obstruct the flow of, or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. The CDFG has the authority to regulate work that will divert, obstruct, or change the natural flow of a river, stream, or lake; change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed. Typical activities regulated by CDFG under Sections 1600-1607 authority include implementing flood control projects, stabilizing banks, creek restoration, constructing river and stream crossings, diverting water, damming streams, and jack-and-boring.

Streams are defined by the presence of a channel bed and bank, and at least an intermittent flow of water. CDFG extends the limits of its jurisdiction either from top-of-bank or to the outermost edges of riparian vegetation. CDFG regulates wetland areas only to the extent that those wetlands are a part of a river, stream, or lake as defined by CDFG. While seasonal ponds are within the CDFG definition of wetlands, they are not part of a river, stream, or lake, and may, or may not, be subject to the jurisdiction of the CDFG under Sections 1601-1603 of the Fish and Game Code.

The California Department of Fish and Game (CDFG) administers the California Endangered Species Act (CESA). The State of California considers an endangered species one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is likely to become an endangered species in the near future in the absence of special protection or management, and a rare species is one that may become endangered if its present environment worsens. Rare species applies to California native plants. Species that are fully protected by California include those protected by special legislation for various reasons, such as the California condor. There is no incidental take allowed for fully protected species. Species of Special Concern is an informal designation used by CDFG for some declining wildlife species that are not proposed for listing as threatened or endangered, such as the burrowing owl. This designation does not provide legal protection, but signifies that these species are recognized as sensitive by CDFG.

In coordination with the USFWS the CDFG also administers the MBTA which provides protections for nesting birds that are both residents and migrants, whether or not they are considered sensitive by resource agencies. The CDFG code 3503 makes it illegal to destroy any birds' nest or any birds' eggs. Code 3503.5 further protects all birds in the orders Falconiformes and Strigiformes (Birds of Prey, such as hawks and owls) and their eggs and nests from any form of take.

State Jurisdiction - Regional Water Quality Control Board (RWQCB)

The RWQCB's regulatory jurisdiction is pursuant to Section 401 of the Federal CWA. The RWQCB typically regulates discharges of dredged or fill material into waters of the U.S., however they also have regulatory authority over waste discharges into Waters of the State, which may be isolated, under the Porter-Cologne Water Quality Control Act issued by the State Water Resources Board. In the absence of a nexus with the Corps, the Regional Board requires the submittal of a Waste Discharge Requirement (WDR) application, which must include a copy of the project Stormwater Pollution Prevention Plan (SWPPP) and a copy of the project Water Quality Management Plan (WQMP), otherwise called a Standard Urban Stormwater Management Plan (SUSMP). The Regional Board's role is to ensure that disturbances in the stream channel do not cause water quality degradation.

7.0 CONCLUSION

The proposed routine maintenance activities cover 96 sites in Marin County. Although the proposed work program is temporary and designed to work around seasonal presence and nesting periods, activities may still result in impacts to sensitive habitat and special status species. There are current records of coho, steelhead, California red-legged frog, salt marsh harvest mouse, California clapper rail and California black rail in or near some of the project sites.

To avoid and minimize impacts to sensitive species and habitats, classroom and field training of contractor staff, protocols for surveying species, and continual site monitoring are recommended.

An appropriate staff member of the Marin County Flood Control and Water Conservation District should be designated as the Environmental Compliance Coordinator (ECC). The ECC will be knowledgeable about and qualified to determine habitat types, identify the special status plant and wildlife species, and follow appropriate protocols. The ECC will conduct pre-construction surveys; conduct trainings for the contractors' supervisors and crew members on special status species, habitat types, and work processes; and direct the implementation of avoidance and minimization measures.

Each Spring, before the work season begins, the ECC should walk each project site segment and note where work needs to occur that year, and what kinds of maintenance activities need to be conducted. At this time, any species present should be noted (see Appendix F for the site assessment data sheet), as well as presence of tree or ground nests, signs of bats, pond turtle burrows, etc.

Each year, the ECC should meet with the contractor foreman and crew supervisors to discuss the proposed maintenance activities and schedule. At this time, the ECC should communicate which special status species may be present at the project sites, what impacts the maintenance activities may have on those special status species, and the avoidance and minimization measures to implement if necessary.

Each year before maintenance activities begin, the ECC should conduct trainings for the contracted personnel. The trainings should include information about the habitat types in which they will be working, the special status species that may be present, how to identify those special status species, and which avoidance and minimization measures to implement in case any special status species are present when maintenance activities are scheduled to begin.

A few days before work is scheduled for a particular project site, the ECC should walk the project site length and search for special status species, ground and tree nests, signs of bats, and active burrows. If necessary, avoidance and minimization measures should be implemented to fence off plants, trees with nests, etc, in order to protect sensitive resources.

Each day before maintenance activities begin, the ECC should walk the project site with the crew supervisors to check for presence of special status species; the appropriate avoidance

and minimization measures should be implemented as necessary to protect sensitive resources.

As the work proceeds, the ECC and crew should take note of any issues that arise and should implement avoidance and minimization measures as required.

Sensitive Vegetation Communities

Impacts to sensitive vegetation communities, including wetlands or other waters of the U.S., or waters of the state, might require mitigation for temporal losses of wetland functions such as wildlife habitat value, water filtration, or groundwater recharge. However, many of the sites are anticipated to be self-mitigating, as wetland vegetation is expected to become re-established following completion of maintenance activities.

Potentially Occurring Special-Status Plant Species

Based on background research, a reconnaissance-level survey, and the presence of suitable habitat, a total of four special-status plant species are considered to have at least some potential to occur within the vicinity of the study area, including within the limits of some of the work sites. These species cannot be ruled out without focused surveys conducted during the appropriate blooming seasons when these species can be readily recognized and identified in the field.

In order to avoid impacts to special-status plant species, botanical surveys are recommended to be conducted in April, May, June, and July for those project sites with the potential for these species, in order to ensure that the potentially occurring special-status plant species, if present, will not be overlooked.

Potentially Occurring Special-Status Wildlife Species

Based on background research, a reconnaissance-level survey, and the presence of suitable habitat, a total of fourteen special-status wildlife species are considered to have at least some potential to occur within the limits of some of the work sites. Two of these species, including California red-legged frog and western pond turtle were detected within the study area. Based on the actual or potential presence, the following recommendations are made to either avoid or minimize potential impacts to special-status wildlife species.

Pre-construction Survey Recommendations

Given the temporary nature of the proposed maintenance activities, specifically those sites where maintenance will be concluded in a very short time period (*i.e.* less than two days), it is recommended that a biological monitor be present on site, prior to the commencement of and during maintenance activities, in lieu of pre-construction surveys. The USFWS, NOAA Fisheries and CDFG should be consulted to approve any of the recommended avoidance recommendations.

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APPENDIX A

FEDERAL AND STATE SPECIAL STATUS SPECIES

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
SPECIES LISTED OR PROPOSED FOR LISTING			
INVERTEBRATES			
Mission blue butterfly *Icaricia icarioides missionensis*	FE/--	Grassland with *Lupinus albifrons* , *L. formosa* , and *L. varicolor*	**Low; removed from analysis.** No occurrences within the project area (CDFG 2010a).
San Bruno elfin butterfly *Incisalia mossii bayensis*	FE/--	Steep north facing slopes within the fog belt with grassy ground cover. Larval host plant is *Sedum spathulifolium* .	**Low; removed from analysis.** There is one known occurrence in the Bolinas quad, on the upper reaches of Lagunitas Creek, which is not near project areas.
Myrtle's silverspot butterfly *Speyeria zerene myrtleae* Pt. Reyes silverspot butterfly *Speyeria zerene puntareyes*	FE/--	Restricted to the foggy coastal dunes/hills of Pt. Reyes Peninsula; Extirpated from coastal San Mateo County.	**Low; removed from analysis.** No occurrences within the project area (CDFG 2010a) and no suitable habitat.
California freshwater shrimp *Syncaris pacifica*	FE/CE	Permanent streams with fishes. Pool areas of low-elevation, low-gradient streams, among exposed live tree roots of undercut banks, overhanging woody debris, or overhanging vegetation. 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.	**Low; removed from analysis.** No occurrences within the project area (CDFG 2010a).
FISH			
Green sturgeon – southern DPS *Acipenser medirostros* Critical Habitat designated	FT/CSSC	Spawn in the Sacramento River and its tributaries; the San Francisco Bay system provides rearing habitat for juveniles.	**Low, removed from analysis.** No occurrences in project area (CDFG, 2004); Marin streams too small.
Tidewater goby *Eucyclogobius newberryi*	FE/CSC	Shallow waters of bays and estuaries, in lower, primarily tidal, stream reaches.	**Low; removed from analysis.** Historical presence in Corte Madera and Novato Creeks, but now extinct in those watersheds (Leidy 2007).
Delta smelt *Hypomesus transpacificus* Critical habitat designated	FT/CT	Restricted to the Sacramento-San Joaquin Delta, including Suisun and San Pablo Bays and the Carquinez Strait.	**Low; removed from analysis.** Not known to occur in the project area (CDFG 2010a, Leidy 2007).
Coho salmon—Central CA coast ESU *Oncorhynchus kisutch* Critical Habitat designated	FE/CE	Accessible Bay Area and coastal rivers and streams with cover, cool water and sufficient dissolved oxygen. Require beds of loose, silt-free gravel for spawning.	**Moderate; retained in analysis.** Known and potential occurrences in Easkoot Creek project area only (Bolinas quad).

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
Steelhead – Central CA Coast DPS *Oncorhynchus mykiss irideus* Critical Habitat designated	FT/CSC	Accessible Bay Area and coastal rivers and streams	**High; retained in analysis.** Known and potential occurrences project area quads within the project area.
Steelhead-Central Valley DPS *Oncorhynchus mykiss irideus* Critical Habitat designated	FT/--	Spawn in the Sacramento and San Joaquin Rivers and their tributaries, migrate through San Francisco and Suisun Bays, as well as the Delta region	**Low; removed from analysis.** Migrators through the bay; management activities that benefit other salmonids will benefit any stragglers.
Chinook salmon—Central Valley spring-run Oncorhynchus tshawytscha Critical Habitat designated	FT/CT	Spawning and rearing restricted to Sacramento River basin, migrate through San Francisco Bay and Sacramento-San Joaquin Delta	**Low; removed from analysis.** Project area does not extend into the range of the ESU. Management activities that benefit other salmonids will benefit any stragglers.
Chinook salmon—fall/late fall-run *Oncorhynchus tshawytscha*	FC/CSC	Spawning and rearing restricted to Sacramento River basin, migrate through San Francisco Bay and Sacramento-SanJoaquin Delta, require clean, cold water and gravel beds	**Low; removed from analysis.** Chinook are known in the lower reaches of Novato and Corte Madera Creeks. Management activities that benefit other salmonids will benefit them.
Chinook salmon—winter run *Oncorhynchus tshawytscha* Critical Habitat designated	FE/CE	Spawning restricted to the Sacramento River. Requires clean, cold water with gravel beds.	**Low; removed from analysis.** Project area does not extend into the range of the ESU. Critical Habitat extends from Golden Gate Bridge to Delta. Management activities that benefit other salmonids will benefit any stragglers.
Sacramento splittail *Pogonichthys macrolepidotus*	FT/CSC	Slow moving river sections and dead-end sloughs with flooded vegetation for spawning and foraging for young.	**Low; removed from analysis.** .Possible in lower reaches of Novato Creek and Simmons Slough; management activities that benefit salmonids will benefit any stragglers.
Longfin smelt *Spirinchus thaleichthys*	FSC/CT	Sacramento-San Joaquin estuary in the salt or brackish water portions of the estuary, require fresh water, sandy-gravel substrates, rocks, and aquatic vegetation for spawning	**Low; removed from analysis.** No occurrences in the project area (CDFG 2010a; Leidy 2007).

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
AMPHIBIANS			
California red-legged frog Rana aurora draytonii	FT/CSC	Breed in stock ponds, pools, and slow-moving streams with emergent vegetation for escape cover and egg attachment. Where water is seasonal often utilizes mammal burrows in upland habitat for aestivation	**Moderate; retained in analysis.** Reported to occur within the project action area (Bolinas quad).
REPTILES			
Northwestern pond turtle *Clemmys marmorata marmorata*	FC/CSSC	Live in or near ponds or slow-moving creeks and need suitable rocks or logs for basking sites and underwater retreats	**Moderate; retained in analysis.** Known to occur within the project area.
BIRDS			
Marbled murrelet *Brachyramphus marmoratus* Critical Habitat designated	FT/CE	Nests in burrows or crevices. Common resident of northwestern coastal forests (temperate rainforest)	**Low; removed from analysis.** No occurrences within the project area (CDFG 2010a); critical habitat is upland of project area.
Swainson's hawk *Buteo swansoni*	--/CT	Breeds in riparian areas and oak savannah, requires adjacent foraging habitat such as grasslands or fields supporting rodent populations	**Low; removed from analysis.** Possible winter resident; no occurrences within the project area; (CDFG 2010a).
Western snowy plover *Charadrius alexandrinus nivosus*	FT/CSC	Nests and forages on sandy beaches on marine and estuarine shores - requires sandy, gravely, or friable soils for nesting	**Low; removed from analysis.** Known to occur at Seadrift near Easkoot Creek; no suitable habitat in the project areas.
Short-tailed albatross *Diomedea albatrus*	FE/CSC		**Low; removed from analysis.** No occurrences within the project area (CDFG 2010a).
Bald eagle *Haliaeetus leucocephalus*	delisted/CE	Nests and forages on inland lakes, reservoirs, and rivers; winter foraging at lakes and along major rivers	**Delisted, removed from analysis.**
California black rail *Laterallus jamaicensis coturniculus*	FSC/CT	Nests and forages in tidal emergent wetland with pickleweed and cordgrass	**Moderate; retained in analysis.** Reported to occur within the project action area in eastern Marin County (San Quentin and San Rafael quads).
California brown pelican *Pelecanus occidentalis californicus*	delisted/3511	Nests on coastal islands of small to moderate size that afford protection from predators.	**Delisted; removed from analysis.**

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
California clapper rail *Rallus longirostris obsoletus*	FE/CE	Nests and forages in emergent wetlands with pickleweed, cordgrass, and bulrush	**Moderate; retained in analysis.** Reported to occur within the project action area in eastern Marin County (San Quentin, Novato and San Rafael quads).
Bank swallow *Riparia riparia*	--/CT	Nests primarily in riparian and other lowland habitat. Requires vertical banks or cliffs with fine textured or sandy soils near water.	**Low; removed from analysis.** No occurrences within the project area (CDFG 2010a).
California least tern *Sterna antillarum browni*	FE/CE	Colonial breeder on bare or sparsely vegetated flat substrates including sand beaches, alkali flats, land fills, or paved areas	**Low; removed from analysis.** No occurrences within the project area (CDFG 2010a).
Northern spotted owl *Strix occidentalis caurina*	FT/--	Nests in old growth forests	**Low; retained in analysis.** Known territories within 1/3 mile of eight project areas (CDFG 2010a).
MAMMALS			
Salt marsh harvest mouse *Reithrodontomys raviventris*	FE/CE	Saline emergent marsh with dense pickleweed	**Moderate; retained in analysis.** Potentially occurs within the project action area in eastern Marin County (San Quentin, San Rafael quads).
PLANTS			
Sonoma alopecurus *Alopecurus aequalis var. sonomensis*	FE/--/List 1B	Freshwater marshes and swamps, riparian scrub	**Low; removed from analysis.** Historically occurred north from Point Reyes Peninsula (Fed. Reg.,1997), outside the project area.
Tiburon mariposa lily *Calochortus tiburonensis*	FT/CT/List 1B	Serpentine grassland	**Low; removed from analysis.** No occurrences within the project area (CDFG, 2004); project areas not in serpentine areas.
Tiburon Indian paintbrush *Castilleja affinis ssp. neglecta*	FE/CT/List 1B	Open serpentine slopes	**Low; removed from analysis.** No occurrences within the project area (CDFG, 2004); project areas not in serpentine areas.
Sonoma spineflower *Chorizanthe valida*	FE/CE/List 1B	Sandy soils in coastal grassland	**Low; removed from analysis.** Known only from occurrences at Pt. Reyes National Seashore (CDFG), outside project action area.

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
Soft bird's beak *Cordylanthus mollis ssp. Mollis*	FE/CR/List 1B	Coastal salt marsh	**Low; removed from analysis.** Known in Marin from only two occurrences near San Antonio Creek (CDFG); CNPS presumes extirpated in Marin.
Marin dwarf flax *Hesperolinon congestum*	FT/CT/List 1B	Grasslands and openings in chaparral, often on serpentinite	**Low; removed from analysis.** 10 occurrences in Marin County, in uplands away from creeks. Project areas not in serpentine.
Santa Cruz tarplant *Holocarpha macradenia* Critical Habitat designated (none in Marin County)	FT/CE/List 1B	Coastal scrub, coastal sand dunes, openings in oak woodlands with sandy or gravelly soil	**Low; removed from analysis.** Historically occurred near Ross Creek (1883 record). CNPS presumes extirpated in Marin County.
Contra Costa goldfields *Lasthenia conjugens*	FE/--/List 1B	Moist grasslands, vernal pools, cismontane woodlands, alkaline playas	**Low; removed from analysis.** USFWS lists this species for the project quads, but there are no occurrences within those quads (CDFG; CNPS).
Mason's lilaeopsis *Lilaeopsis masonii*	--/CR/List 1B	Brackish or freshwater marshes and swamps, riparian scrub	**Low; removed from analysis.** No occurrences within the project quads (CDFG; CNPS).
White-rayed pentachaeta *Pentachaeta bellidiflora*	FE/CE/List 1B	Open dry rocky slopes and grassland, often on soils derived from serpentinite.	**Low; removed from analysis.** Historically occurred from Santa Cruz to Marin counties; currently known only from one occurrence in San Mateo. CNPS presumes extirpated in Marin County.
Tiburon jewelflower *Streptanthus niger*	FE/CE/List 1B	Serpentine outcrops in grasslands	**Low; removed from analysis.** No occurrences within the project area (CDFG, 2004); project areas not in serpentine areas.
Showy indian clover *Trifolium amoenum*	FE/--/List 1B	Coastal bluff scrub; valley and foothill grasslands	**Low; removed from analysis.** One record in Stinson Beach area from 1927; CNPS presumes extirpated in Bolinas quad. Habitat at site is not suitable.

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN			
INVERTEBRATES			
Sonoma arctic skipper *Carterocephalus palaemon ssp. Magnus*	FSC/--	Prefers shady redwood forest. Inhabits openings in heavily forested woods, moist meadows, and streamsides; larval host plants include purple reedgrass and bromes.	**Low.** No suitable habitat in the project areas (Baye and Wright 2004).
Monarch butterfly *Danaus plexippus*	--/*	Winter in California. Roost in wind protected eucalyptus, Monterey pine, and cypress groves, with water and nectar sources nearby.	**Low.** Known to occur near the Easkoot Creek project areas from September to March. Avoid work past September 1st.
Marin elfin butterfly *Incisalia mossii marinensis*	FSC/--	Rocky outcrops, woody canyons, cliffs; host plant includes stonecrop (*Sedum, Sedella, Dudleya,* and *Parvisedum*) species	**Low.** No habitat in the project areas.
San Francisco lacewing *Nothochrysa californica*	FSC/--	Inhabits moist woodlands near the coast with coast live oak or pine.	**Low.** Suitable habitat is not present in the project areas.
Mimic tryonia *Tryonia imitator*	FSC/--	Coastal lagoons, estuaries, and salt marshes from Sonoma County to San Diego County.	**Low.** Known in Petaluma River and San Rafael Creek, but not in project areas.
FISH			
Sacramento perch *Archoplites interruptus*	FSC/CSC	Slow moving sloughs, streams, rivers, and lakes	**Low.** Native but extinct in Corte Madera Creek (Leidy 2007)
River lamprey *Lampetra ayresi*	FSC/--	Larger coastal streams in the San Francisco Bay drainage system	**Low**. Low density in SF Bay.
Pacific lamprey *Lampetra tridentata*	FSC/--	Pacific Ocean and estuaries; spawning in coastal streams from Alaska to Baja California	**Low.** Low density in SF Bay. Possibly in Corte Madera Creek (Leidy 2007).
AMPHIBIANS			
Foothill yellow-legged frog *Rana boylii*	FSC/CSC	Partly shaded streams with riffles and quiet pools absent of predatory fish	**Low.** Present in Marin, but not known in the project areas; habitat not suitable..
BIRDS			
Cooper's hawk *Accipiter cooperi*	--/CSC	Nests in riparian growths of deciduous trees and live oak woodlands	**Low.** No habitat in project areas.
Sharp-shinned hawk *Accipiter striatus*	--/CSC	Nests in riparian growths of deciduous trees and live oaks	**Low.** No habitat in project areas.
Tricolored blackbird *Agelaius tricolor*	FSC/CSC	Riparian thickets and emergent vegetation near open water	**Low.** Winter in Marin, especially in Pt. Reyes, but not in project areas (PRBO).
Grasshopper sparrow *Ammodramus savannarum*	FSC/--	Favors grasslands and pastures over 100 acres.	**Low.** No habitat in project areas.

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
Golden eagle *Aquila chrysaetos*	CSC/3511	Open hills with grassland, open scrub, adequate prey base, large trees or cliffs for nesting	**Low.** Not known in project areas.
Great egret *Ardea alba*	--/*	Colonial nesters in large trees near marshes, tidal flats, or irrigated pastures	**Low.** Nest in Bolinas Lagoon, possibly near Santa Venetia, but not in other project areas.
Great blue heron *Ardea herodias*	--/*	Nests in trees along lakes and estuaries	**Low.** Nest in Bolinas Lagoon, possibly near Santa Venetia, but not in other project areas.
Short-eared owl *Asio flammeus*	--/CSC	Fresh water and salt marshes and swamps, lowland meadows, irrigated fields	**Low.** Not known to breed in Marin; no CNDDB records in Marin.
Western burrowing owl *Athene cunicularia hypugaea*	FSC/CSC	Nests in mammal burrows in open, arid grasslands	**Low.** Not known to breed in Marin.
Oak titmouse *Baelophus inornatus*	FSLC/--	Prefers open woodlands of warm, dry oak and oak-pine.	**Moderate.** Known to be yearlong resident in Marin
Ferruginous hawk Buteo regalis	FSC/CSC	Dry open country with a variety of habitats.	**Low.** Possible winter resident in Marin County.
Lawrence's goldfinch Carduelis lawrencei	FSC/--	Dry grassy slopes and chaparral; prefers fiddlenecks	**Low.** Not likely to be found in project areas.
Vaux's swift *Chaetura vauxi*	FSC/--	Riparian woodlands and woodlands near lakes	**Low.** Mostly in West Marin; no confirmed breeding records.
Northern harrier *Circus cyaneus*	--/CSC	Mostly nests in emergent vegetation, wet meadows or near rivers and lakes, but may nest in grasslands away from water.	**Moderate**; known to breed in Pt Reyes; often observed from Santa Venetia to Novato along San Pablo Bay.
Black swift Cypseloides niger	FSC/CSC	Colonial breeders using cliffs in deep canyons	**Low.** Known in Boinas quad, but no suitable habitat at project area.
Yellow warbler *Dendroica petechia brewsteri*	--/CSC	Prefers dense riparian habitat with willows, cottonwoods, or alders for nesting and foraging	**Low.** Not known to breed in or near the project areas.
Snowy egret *Egretta thula*	--/*	Marshes, tidal flats, lakes, streams	**Low.** Nest on West Marin Island, but not in project areas.
White-tailed kite *Elanus leucurus*	--/3511	Found in open grasslands with scattered trees for nesting and perching.	**Low.** No nesting habitat, could be forager.
California horned lark *Eremophila alpestris actia*	--/CSC	Short grass prairie, fallow grain fields, open areas with short vegetation	**Low.** No suitable habitat within the project areas.
American peregrine falcon *Falco peregrinus anatum*	Delisted/3511	Nests near wetlands, lakes, rivers, or other water on cliffs, banks, human structures	**Low.** No nesting habitat, could be forager.
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	FSC/CSC	Saline and freshwater marshes with adjacent riparian thickets.	**Low.** Yearlong resident in Marin County, but not known to breed in project areas.

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
Harlequin duck *Histrionicus histrionicus*	FSC/CSC	Nests along shores of shallow, swift rivers with plentiful aquatic invertebrates.	**Low.** Possible winter resident only.
Loggerhead shrike *Lanius ludovicianus*	FSC/CSC	Nests in shrublands and forages in open grasslands	**Low.** Locally present but not abundant.
Lewis's woodpecker *Melanerpes lewis*	FSC/--	Open woodlands in interior foothills and valleys	**Low.** Project areas are not in normal range.
San Pablo song sparrow *Melospiza melodia samuelis*	FSC/CSC	Tidal sloughs in salt marshes with pickleweed, restricted to north side of San Francisco Bay and Suisun Bay	**Moderate.** Known to occur in the Eastern Marin project areas.
Long-billed curlew *Numenius americanus*	FSC/--	Lake beaches, nests in both dry and wet uplands	**Low.** Marin is winter range only.
Black-crowned night heron *Nycticorax nycticorax*	--/*	Lake margins, mud bordered bays, marshy areas	**Moderate.** Known to forage in tidal project areas (breed offshore).
Ashy storm petrel *Oceanodrama homochroa*	FSC/CSC	Coastal/oceanic habitats. Nests on islands with natural cavities or provided burrows	**Low.** No habitat in project areas.
Osprey *Pandion haliaetus*	--/CSC	Along rivers, lakes, and coasts	**Low.** Breeds at Kent Lake; not present in project areas.
Double-crested cormorant *Phalacrocorax auritus*	--/CSC	Nests along coast on isolated islands or in trees along lake margins.	**Low.** Potentially adjacent to tidal project areas.
Nuttall's woodpecker *Picoides nuttallii*	FSLC/--	Oak woodland, chaparral, riparian (esp-willow-cottonwood) woodland; often foothill canyons.	**Moderate.** Known to occur in project areas in eastern Marin, especially Novato; breed through June.
Allen's hummingbird *Selasphorus sasin*	FSC/--	Near the coast in mixed evergreen, riparian woodlands, eucalyptus and cypress groves, oak woodlands, and coastal scrub.	**Low.** Possible summer resident in Easkoot Creek project areas.
Caspian tern *Sterna caspia*	--/*	Protected coastal waters, lakes, rivers, fresh and salt water wetlands, especially estuaries, coastal bays and beaches. Nest on low sand or gravel with sparse vegetation.	**Low.** Possible summer resident in Marin; project areas do not have suitable habitat.
Elegant tern *Sterna elegans*	FSC/CSC	Does not nest in northern California, forages in inshore coastal waters, bays, and estuaries	**Low.** Possible summer resident in Marin; project areas do not have suitable habitat.
MAMMALS			
Pallid bat *Antrozous pallidus*	--/CSC	Open, dry habitats with rocky outcrops, cliffs, caverns, and crevices for roosting	**Moderate.** Known in Ross Creek project area; widespread but not abundant.
Townsend's western big-eared bat *Corynorhinus townsendi townsendii*	FSC/CSC	Humid coastal regions, will only roost in the open, extremely sensitive to disturbance	**Low.** Known well NW of Easkoot Creek project areas.

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
Greater western mastiff bat *Eumops perotis californicus*	FSC/CSC	Open arid to semi-arid habitats, including woodlands, coastal scrub, chaparral, and grasslands. Roosts in trees, cliffs, dwellings	**Low.** No records in CNDDB for Marin County. Wide range but not abundant.
Small-footed myotis *Myotis ciliolabrum*	FSC/--	Open arid habitats. Nursery colonies in caves, crevices, clay banks. Roosts in caves, dwellings, crevices.	**Low.** No records in CNDDB for Marin County. Wide range but not abundant.
Long-eared myotis *Myotis evotis*	FSC/--	Brush, woodland, and forest habitats, prefers coniferous habitat types. Nursery colonies in buildings, crevices, spaces under tree bark, and snags.	**Low.** No records in CNDDB for Marin County. Wide range but not abundant.
Fringed myotis *Myotis thysanodes*	FSC/--	A wide variety of habitats. Optimal habitats are valley-foothill hardwood and hardwood-conifer types. Uses caves, buildings, or crevices for roosting and nursery colonies.	**Low.** No records in CNDDB for Marin County. Wide range but not abundant.
Long-legged myotis *Myotis volans*	FSC/--	Most common in woodland and forest habitats above 4000 feet. Use trees and caves for roosting, hollow trees or spaces under tree bark for nursery colonies.	**Low.** No records in CNDDB for Marin County. Wide range but not abundant.
Yuma myotis *Myotis yumanensis*	FSC/--	Optimal habitat is open forests or woodlands with sources of water and flying insects. Nursery colonies in caves, buildings, or crevices.	**Low.** No records in CNDDB for Marin County. Wide range but not abundant.
PLANTS			
Napa false indigo *Amorpha californica var. napensis*	--/--/List 1B	Dry slopes in yellow pine forest, chaparral, mixed evergreen forest, northern oak woodland	**Low.** Known in Marin, but no suitable habitat in project areas.
Bent-flowered fiddleneck *Amsinckia lunaris*	--/--List 1B	Coastal bluff scrub, cismontane woodland, valley and foothill grassland	**Low.** Known in Marin County, but not within project areas.
Marsh milk-vetch *Astragalus pychnostachyus var. Pychnostachyus*	FSLC/--/List 1B	Coastal and saltmarsh habitats	**Low.** Known historically to occur near Easkoot Creek project areas, but CNPS presumes it extirpated in Bolinas quad..
Small groundcone *Boschniakia hookeri*	--/--/List 2	Redwood forests	**Low.** Known to occur near Larkspur Cr and Arroyo Corte Madera del Presidio project areas..
Salt marsh owl's clover *Castilleja ambigua ssp. ambigua*	FSLC/--List 1B	Salt marshes	**Low.** Known to occur in Marin; no records in CNDDB.

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
Point Reyes bird's beak *Cordylanthus maritimus ssp. palustris*	FSC/--/List 1B	Coastal salt marsh	**Moderate.** Known to occur in west and east Marin County project areas.
Western leatherwood *Dirca occidentalis*	--/--/List 1B	Broadleafed upland forests, closed-cone coniferous forests, chaparral, cismontane woodland, North coast coniferous forests, riparian forests, riparian woodland; mesic sites	**Low.** Known to occur in Bolinas quad, but well upslope of Easkoot Creek project areas.
Streamside daisy *Erigeron biolettii*	--/--/List 3	Rocky, mesic sites in broadleafed upland forest, cismontane woodland, and North Coast coniferous forest	**Low.** Known to occur in Marin; no records in CNDDB. No suitable habitat in project areas.
Marin checker lily *Fritillaria affinis var. tristulis = F. lanceolata*	--/--/List 1B	Coastal prairie, northern coastal scrub	**Low.** Known in Bolinas quad, but no suitable habitat in the Easkoot Creek project areas.
Dune gilia *Gilia capitata ssp. chamissonis*	--/--/List 1B	Coastal dunes and coastal scrub	**Low.** 1905 occurrence at Easkoot Creek project area, but habitat is not suitable.
Diablo helianthella *Helianthella castanea*	FSC/--/List 1B	Openings in chaparral and broadleaved upland forest	**Low.** Known in Mill Valley project areas; habitat at project areas is not good for this species.
Hayfield tarplant *Hemizonia congesta ssp. leucocephala*	--/--/List 1B	Coastal scrub, valley and foothill grassland	**Moderate.** Known near Arroyo San Jose project area.
Tiburon tarplant *Hemizonia multicaulis ssp. vernalis*	FSC/--/--	Highly restricted distribution in coastal scrub and grassland habitats	**Low.** No records in CNDDB.
Delta mudwort *Limosella subulata*	--/--/List 2	On mud banks in freshwater and brackish marshes and swamps, riparian scrub	**Low.** Known to occur in Marin; no records in CNDDB.
Marsh microseris *Microseris paludosa*	--/--/List 1B	Wet areas in a variety of habitats, including coastal scrub and valley and foothill grassland	**Moderate.** Known near Larkspur Cr, Arroyo Corte Madera del Presidio, and Cascade Cr project areas.
Hairless popcorn-flower *Plagiobothrys glaber*	--/--/List 1A	Coastal salt-marsh, alkaline flats, meadows, and seeps	**Low.** Historic record (1924) in Coyote Creek area; presumed extirpated in Marin (CNPS).
Marin knotweed *Polygonum marinense*	FSC/--/List 3	Marshes and swamps	**Moderate.** Known in Corte Madera Creek project area.
Tamalpais oak *Quercus parvula var. tamalpaisensis*	--/--/List 1B	Known only from Mt. Tamalpais, lower montane coniferous forest	**Low.** Known in upland parts of San Rafael quad; no suitable habitat in project areas.
Point Reyes checkerbloom *Sidalcea calycosa ssp. rhizomata*	--/--/List 1B	Coastal freshwater marshes and swamps	**Low.** Known in upper San Anselmo and Lagunitas Creeks, but no suitable habitat in project areas.

SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING AT THE PROJECT SITES

Common Name *Scientific Name*	Listing Status FWS/DFG/CNPS	Habitat Requirements	Potential Occurrence
Marin checkerbloom *Sidalcea hickmanii ssp. viridis*	FSC/--/List 1B	Chaparral, usually on serpentinite	**Low.** Known to occur near Easkoot Creek, but no suitable habitat in project areas.
Pacific cordgrass *Spartina foliosa*	FSLC/--/--	Salt marshes	**Low.** Known near baylands project areas, but outside of project work areas.

APPENDIX B

PRELIMINARY LIST OF PROJECT SITES WITHIN THE JURISDICTION OF THE U.S. ARMY CORPS OF ENGINEERS

Project Sites within USACE Jurisdiction

Site ID	Creek	Location Description	Tidal Character	Natural bottom	Concrete bottom
FLOOD CONTROL ZONE 1 - NOVATO					
1-ASJ-2	Arroyo de San Jose	Hwy 101 to silt basin US of Ignacio Blvd	Non-tidal		X
FLOOD CONTROL ZONE 3 - RICHARDSON BAY					
3-BM	Bothin Marsh	E. Blithedale Ave at Roque Moraes Dr	Tidal	X	
3-COY-2	Coyote Creek	Start of concrete channel to Laurel Way	Tidal		X
3-COY-3	Coyote Creek	Laurel Way to US of Ash St	Non-tidal		X
3-MIL-1	Miller Ave drainage	Just S of Miller Ave/Camino Alto intersection	Tidal	X	X
3-MIL-2	Miller Ave drainage	E side of Miller Ave across from Tamalpais HS	Tidal	X	
3-MIL-3	Miller Ave drainage	Across from Tamalpais HS track between Miller Ave and Bothin Marsh multiuse path	Tidal	X	
3-REED-1	Reed Creek	ACMP confluence US approximately 200 ft	Tidal	X	
3-SUT-1	Sutton Manor	Roque Moraes Dr just S of E. Blithedale Ave	Tidal	X	
3-SUT-2	Sutton Manor	Roque Moraes Dr to Ashford Ave	Tidal	X	
3-SUT-3	Sutton Manor	Ashford Ave to Dorset Ln	Tidal		X
FLOOD CONTROL ZONE 4 - BEL AIRE AND STRAWBERRY CIRCLE					
4-EAST-2	East Creek	From tidal extent to end of Karen Way	Non-tidal	X	
4-WEST-1	West Creek	From Tiburon Blvd US to tidal extent (approx 425 ft)	Tidal	X	
FLOOD CONTROL ZONE 7 - SANTA VENETIA					
7-EST	Estancia Ditch	Pump Station 4 to Pump Station 5	Non-tidal	X	
7-LAP-1	Gallinas Creek South Fork	La Pasada Way intersection with Vendola Dr	Tidal	X	
7-MEA-1	Gallinas Creek South Fork	Meadow Way Interceptor Outlet; end of Meadow Way at Gallinas Creek	Tidal	X	
FLOOD CONTROL ZONE 9 - ROSS VALLEY					
9-CMC-2	Corte Madera Creek	Start of concrete channel to tidal extent	Tidal		X

APPENDIX C

PROJECT AREA AND SITE MAPS

Please see Appendix C in Programmatic Approach to Routine Maintenance Activities document for the maps.

APPENDIX D

PLANT SPECIES DETECTED

Plant Species Detected at the RMA Sites

Family *Scientific Name*	Common Name	
Aceraceae (Maple family)		
Acer negundo	box-elder maple	
Acer macrophyllum	big-leaf maple	
Anacardiaceae (Sumac Family)		
Toxicodendron diversilobum	poison-oak	
Apiaceae (Parsley Family)		
Conium maculatum	poison hemlock	*
Daucus carota	Queen Anne's lace	*
Foeniculum vulgare	sweet fennel	*
Heracleum maximum	cow parsnip	
Oenanthe sarmentosa	water parsley	
Osmorhiza (berteroi) chilensis	sweet cicely	
Apocynaceae (Dogbane Family)		
Vinca major	periwinkle	*
Aquifoliaceae (Holly Family)		
Ilex aquifolium	English holly	*
Araliaceae (Aralia Family)		
Hedera helix	English ivy	*
Aristolochiaceae (Birthwort Family)		
Aristolochia californica	California pipe-vine	
Asteraceae (Sunflower Family)		
Achillea millefolium (A. borealis)	yarrow	
Anaphalis margaritacea	pearly everlasting	
Artemisia californica	California sagebrush	
Baccharis pilularis	coyotebrush	
Carduus pycnocephalus	Italian thistle	*
Centaurea calcitrapa	purple star-thistle	*
Chamomilla suaveolens (Matricaria matricarioides)	pineapple weed	*
Cirsium vulgare	bull thistle	*
Cotula coronopifolia	brass-buttons	*
Delairea odorata	Cape ivy	*
Euthamia occidentalis	Western goldenrod	
Gnaphalium spp	cudweed	
Grindelia stricta var. angustifolia	shrubby saltmarsh gumplant	

Plant Species Detected at the RMA Sites

Family *Scientific Name*	Common Name	
Jaumea carnosa	jaumea	
Lasthenia californica/ L. gracilis	goldfields	
Madia sativa	tall tarplant	
Microseris sp	dandelion	
Picris echioides	bristly ox-tongue	*
Senecio vulgaris	common groundsel	*
Taraxacum officinale	dandelion	*
Betulaceae (Birch Family)		
Alnus rhombifolia	white alder	
Alnus rubra	red alder	
Corylus cornuta var. californica	California hazelnut	
Berberidaceae		
Berberis nervosa	longleaf Oregon grape	
Berberis pinnata	shortleaf Oregon grape	
Boraginaceae (Borage Family)		
Echium candicans (E. fastuosum)	Pride of Madeira	*
Brassicaceae (Mustard Family)		
Brassica nigra	black mustard	*
Brassica rapa	field mustard	*
Cardamine californica var. californica	woodland milkmaids	
Lepidium strictum (L. pubescens)	peppergrass	*
Lepidium latifolium	perennial peppergrass	*
Raphanus sativus	wild radish	*
Rorippa nasturtium-aquaticum	watercress	*
Caprifoliaceae Honeysuckle Family)		
Lonicera hispidula var. vacillans	California honeysuckle	
Sambucus nigra var caerulea	blue-berried elderberry	
Symphoricarpus albus var. laevigatus	tall snowberry	
Symphoricarpos mollis	creeping snowberry	
Chenopodiaceae (Goosefoot Family)		
Calystegia purpurata ssp. purpurata	common morning glory	
Convolvulus arvensis	field bindweed	*
Salicornia virginica	perennial pickleweed	

Plant Species Detected at the RMA Sites

Family *Scientific Name*	Common Name	
Cornaceae		
Cornus sericea	creek dogwood	
Cyperaceae (Sedge Family)		
Carex globosa	round-fruited sedge	
Carex gracilior	slender sedge	
Carex obnupta	tall sedge	
Carex praegracilis	turf sedge	
Cyperus eragrostis	umbrella sedge	
Scirpus microcarpus	broadleafed bulrush	
Scirpus (Schenoplectus) robustus (or S. maritimus)	saltmarsh bulrush	
Dennstaedtiaceae (Bracken-Fern Family)		
Pteridium aquilinum var. pubescens	western bracken-fern	
Dipsacaceae (Teasel Family)		
Dipsacus sativus	teasel	*
Dryopteridaceae (Woodfern Family)		
Polystichum californicum	California sword fern	
Ericaceae		
Arbutus menziesii	madrone	
Arctostaphylos manzanita	common manzanita	
Rhododendron macrophyllum	western rhododendron	
Rhododendron occidentale	western azalea	
Equisetaceae (Horsetail Family)		
Equisetum arvense	common horsetail	
Equisetum telmateia ssp. braunii	giant horsetail	
Fabaceae (Pea Family)		
Acacia spp.	acacia spp.	*
Cytisus scoparius	Scot's broom	*
Genista monspessulana	French broom	*
Lotus corniculatus	bird's-foot trefoil	*
Lupinus albifrons	silverleaf lupine	
Lupinus formosus	lupine	
Medicago polymorpha	bur clover	*
Melilotus indica	yellow sweet clover	*
Spartium junceum	Spanish broom	*

Plant Species Detected at the RMA Sites

Family *Scientific Name*	Common Name	
Trifolium albopurpureum var. albopurpureum	Indian clover	
Ulex europaeus	gorse	*
Vicia sativa ssp. Nigra	narrow-leaved common vetch	*
Vicia sativa ssp. Sativa	broad-leaved common vetch	*
Fagaceae (Oak Family)		
Chrysopsis chrysophylla	giant chinquapin	
Lithocarpus densiflorus	tanbark oak	
Quercus agrifolia	coast live oak	
Quercus berberidifolia	scrub oak	
Quercus chrysolepis	canyon live oak	
Quercus douglasii	blue oak	
Quercus garryana	Oregon oak	
Quercus lobata	valley oak	
Quercus kelloggii	black oak	
Frankeniaceae (Frankenia Family)		
Frankenia salina	alkali heath	
Geraniaceae (Geranium Family)		
Erodium botrys	broad-leaf filaree	*
Erodium cicutarium	red-stem filaree	*
Geranium dissectum	cut-leaved cranesbill	*
Grossulariaceae Gooseberry Family)		
Ribes californicum	California gooseberry	
Ribes sanguineum var. glutinosum	pink flowering currant	
Hippocastanaceae		
Aesculus californica	California buckeye	
Iridaceae (Iris Family)		
Sisyrinchium bellum	blue-eyed grass	
Juncaceae (Rush Family)		
Juncus patens	blue-green rush	
Juncus tenuis (was occidentalis)	western rush	
Juncus xiphioides	iris-leaved rush	
Lamiaceae/Labiatae (Mint Family)		
Mentha pulegium	pennyroyal	*

Plant Species Detected at the RMA Sites

Family *Scientific Name*	Common Name	
Monardella villosa ssp. villosa	coyote mint	
Stachys ajugoides var. rigida	hedge-nettle	
Lauraceae		
Umbellularia californica	California bay-laurel	
Lemnaceae (Duckweed Family)		
Lemna minor	duckweed	
Liliaceae (Lily Family)		
Chlorogalum pomeridianum var. pomeridianum	soap plant	
Malvaceae (Mallow Family)		
Malva nicaeensis	common mallow	*
Myricaceae		
Morella californica	California wax myrtle	
Myrtaceae		
Eucalyptus globulus	blue-gum eucalyptus	*
Oleaceae		
Fraxinus latifolia	Oregon ash	
Olea europaea	olive	*
Onagraceae (Evening Primrose Family)		
Camissonia (Oenothera) ovata	sun-cups	
Epilobium canum ssp. canum	California fuchsia	
Oxalidaceae (Oxalis Family)		
Oxalis albicans ssp. pilosa	Wood-sorrel	
Papaveraceae (Poppy Family)		
Eschscholzia californica	California poppy	
Pinaceae (Pine Family)		
Pinus radiata	Monterey pine	*
Pseudotsuga menziesii	Douglas-fir	
Plantaginaceae (Plantain Family)		
Digitalis purpurea	foxglove	*

Plant Species Detected at the RMA Sites

Family *Scientific Name*	**Common Name**	
Plantago erecta	dwarf plantain	
Plantago lanceolata	English plantain	*
Plantago major	common broadleaf plantain	*
Poaceae/Gramineae (Grass Family)		
Agrostis sp.	bentgrass	*
Avena barbata	slim oat	*
Avena fatua	fat oat	*
Briza maxima	rattlesnake grass	*
Briza minor	little rattlesnake grass	*
Bromus diandrus	ripgut brome	*
Bromus hordeaceus	soft brome, chess	*
Bromus rubens	foxtail chess	*
Cortaderia sp	pampas grass	*
Cynodon dactylon	Bermuda grass	*
Cynosurus echinatus	dogtail grass	*
Dactylis glomerata	orchard grass	*
Distichlis spicata	saltgrass	
Elymus glaucus ssp. glaucus	blue wild-rye	
Festuca arundinacea	tall fescue	*
Holcus lanatus	velvet grass	*
Hordeum marinum ssp. Gussoneanum	Mediterranean barley	*
Hordeum murinum ssp. Leporinum	farmers' foxtail	*
Leymus triticoides	wheatgrass leymus	
Lolium multiflorum	Italian annual ryegrass	*
Lolium perenne	perennial ryegrass	*
Melica californica	grassland melicgrass	
Melica torreyana	slender melicgrass	
Nassella lepida	slender needlegrass	
Nassella (Stipa) pulchra	purple needlegrass	
Phalaris aquatica (P. tuberosa var. stenoptera)	Harding grass	*
Spartina foliosa	Pacific cordgrass	
Vulpia bromoides	brome-like annual fescue	*
Polygonaceae (Buckwheat Family)		
Eriogonum fasciculatum	bush buckwheat	
Eriogonum nudum var. nudum	nude buckwheat	
Rumex conglomeratus	clusterd dock	*
Rumex crispus	curly dock	*

Plant Species Detected at the RMA Sites

Family ***Scientific Name***	**Common Name**	
Polemoniaceae (Gilia/Phlox Family)		
Gilia clivorum	small gilia	
Navarretia squarrosa	skunkweed	
Polypodiaceae		
Polypodium californicum	California polypody	
Portulacaceae (Purslane Family)		
Claytonia perfoliata	miners' lettuce	
Primulaceae (Primrose Family)		
Anagallis arvensis	scarlet pimpernel	*
Dodecatheon hendersonii	shooting star	
Pteridaceae		
Adiantum jordanii	California maidenhair	
Ranunculaceae (Buttercup/Crowfoot Family)		
Ranunculus californicus	California buttercup	
Rhamnaceae		
Ceanothus foliosus var. foliosus	indigo bush	
Ceanothus thyrsiflorus	blueblossom	
Rhamnus (Frangula) californica	coffee-berry	
Rosaceae (Rose Family)		
Adenostoma fasciculatum	chamise	
Amelanthier utahensis	service berry	
Heteromeles arbutifolia	toyon	
Pyracantha spp.	firethorn	*
Rosa californica	California wild rose	
Rubus armeniacus	Himalaya blackberry	*
Rubus ursinus	California wild blackberry	
Rubiaceae		
Galium trifidum	marsh bedstraw	
Salicaceae Willow Family)		
Salix exigua	narrow-leaved willow	
Salix laevigata	red willow	
Salix lasiolepis	arroyo willow	

Plant Species Detected at the RMA Sites

Family *Scientific Name*	**Common Name**
Salix lucida lasiandra	yellow willow
Salix scouleriana	Scouler's willow
Salix sitchensis	Sitka willow
Scrophulariaceae (Figwort Family)	
Castilleja densiflora var. densiflora	common owl's clover
Mimulus aurantiacus	sticky monkeyflower
Mimulus guttatus	common monkeyflower
Scrophularia californica ssp. californica	bee-plant
Taxodiaceae	
Sequoia sempervirens	coast redwood
Taxaceae	
Torreya californica	California nutmeg
Typhaceae (Cattail Family)	
Typha angustifolia	narrow-leaf cattail
Typha latifolia	broad-leaf cattail

Notes

* denotes non-native plants or natives planted out of natural native location.

APPENDIX E

WILDLIFE SPECIES DETECTED

Wildlife Species Detected at the RMA Sites

CLASS **Family** ***Scientific Name***	**Common Name**
INSECTA	
Vespidae	
Vespula sp.	Yellowjacket
OSTEICHTHYES	
Salmonidae	
Oncorhynchus mykiss irideus	Steelhead
AMPHIBIA	
Ranidae	
Rana draytonii	California red-legged frog
Rana catesbeiana	Bullfrog
Hylidae	
Pseudacris regilla	Pacific chorus frog
REPTILIA	
Emydidae	
Clemmys marmorata marmorata	Northwestrn pond turtle
AVES	
Anatidae	
Anas platyrhynchos	Mallard
Ardeidae	
Egreta thule	Snowy egret
Cathartidae	
Cathartes aura	Turkey vulture
Accipitridae	
Accipiter striatus	Sharp-shinned hawk
Buteo jamaicensis	Red-tailed hawk
Rallidae	
Laterallus jamaicensis coturniculus	California black rail
Rallus longirostria obsoletus	California clapper rail
Columbidae	
Zenaida macroura	Mourning dove
Trochilidae	
Calypte anna	Anna's hummingbird
Picidae	
Picoides nuttalli	Nuttall's woodpecker
Melanerpes formicivorus	Acorn woodpecker

Wildlife Species Detected at the RMA Sites

CLASS **Family** ***Scientific Name***	**Common Name**
Corvidae	
Aphelocoma coerulescens	Westren scrub jay
Cyanocitta stelleri	Steller's jay
Corvus brachyrhynchos	American crow
Paridae	
Parus rufescens	Chestnut-backed chickadee
Mimidae	
Mimus polyglottos	Northern mockingbird
Parulidae	
Dendroica coronata	Yellow-rumped warbler
Emberizidae	
Junco hyemalis	Dark-eyed junco
Pipilo crissalis	California towhee
Regulidae	
Regulus calendula	Ruby-crowned kinglet
Icteridae	
Euphagus cyanocephalus	Brewer's blackbird
Fringillidae	
Carpodacus mexicanus	House finch
MAMMALIA	
Cervidae	
Odocoileus hemionus	Mule deee
Sciuridae	
Sciurus carolinensis	Gray squirrel

APPENDIX F

SITE ASSESSMENT DATA SHEET

Marin County / Department of Public Works / Flood Control and Water Conservation District
Routine Maintenance Agreement Site Assessment Data Sheet

Site ID: _____ Date: _____

Staff Name: _____ Photo#: _____

Site Notes: _____

_____

_____

Wetlands / US: _____

VEGETATION

Shading of stream: None Low Moderate High

Riparian Vegetation Trees > 10m Present Absent

Percentage Cover: Dominant species:

Trees _____ % _____

Shrubs / vines / rushes _____ % _____

Grasses / herbs / ferns _____ % _____

Barren _____ %

Weeds observed _____

_____

Special status species observed: _____

_____

ANIMALS

Habitat present: Coho / SH / CH Rails / SMHM Birds (tree-nesting)

NWPT Bats BUOW

_____

_____

Species observed:

Birds _____

_____

Amph / Reptiles _____

Mammals _____

Other _____

APPENDIX F

BMP REFERENCES

Activity	Source	Number	Title
Waste/Materials Mngmnt	CASQA Construction BMP Handbook	WM-3	Stockpile Management
Waste/Materials Mngmnt	CASQA Municipal BMP Handbook	SC-34	Waste Handling and Disposal
Equipment/Vehicles	CASQA Municipal BMP Handbook	SC-21	Vehicle and Equipment Cleaning
Resource Protection	CASQA Construction BMP Handbook	EC-1	Scheduling
Resource Protection	CASQA Construction BMP Handbook	EC-2	Preservation of Existing Vegetation
Resource Protection	CASQA Construction BMP Handbook	EC-12	Streambank Stabilization
Resource Protection	FishNet4C	A-229	Seasonal Planning
Sediment Control	CASQA Construction BMP Handbook	EC-7	Geotextiles and Mats
Sediment Control	CASQA Construction BMP Handbook	EC-12	Streambank Stabilization
Sediment Control	CASQA Construction BMP Handbook	SE-1	Silt Fence
Sediment Control	CASQA Construction BMP Handbook	SE-2	Sediment Basin
Sediment Control	CASQA Construction BMP Handbook	SE-3	Sediment Trap
Sediment Control	CASQA Construction BMP Handbook	SE-8	Sandbag Barrier
Sediment Control	CASQA Construction BMP Handbook	SE-9	Straw Bale Barrier
Sediment Control	CASQA Construction BMP Handbook	TC-1	Stabilized Construction Entrance/Exit
Sediment Control	CASQA Construction BMP Handbook	WE-1	Wind Erosion Control
Sediment Control	FishNet4C	A-53	Blankets/Geotextile Fabric
Sediment Control	FishNet4C	A-61	Coir Fabric-Netting
Sediment Control	FishNet4C	A-63	Coir Logs/Straw Rolls
Sediment Control	FishNet4C	A-71	Mulching
Sediment Control	FishNet4C	A-101	Check Dam - Straw Bale
Sediment Control	FishNet4C	A-103	Concrete Washout
Sediment Control	FishNet4C	A-107	Containment of Concrete Pours
Sediment Control	FishNet4C	A-109	Silt Mat Inlet
Sediment Control	FishNet4C	A-113	Silt Mat/Vegetated Grassy Swale
Sediment Control	FishNet4C	A-117	Silt Fence
Sediment Control	FishNet4C	A-141	Turbidity Curtain
Erosion Control	CASQA Construction BMP Handbook	EC-12	Streambank Stabilization
Erosion Control	FishNet4C	A-185	Brush Mattress
Erosion Control	FishNet4C	A-191	Harvesting and Handling Woody Cuttings
Erosion Control	FishNet4C	A-193	Large Woody Debris Revetment
Erosion Control	FishNet4C	A-197	Willow Wall Revetment
Erosion Control	FishNet4C	A-203	Live Stakes
Erosion Control	FishNet4C	A-211	Wattles/Fascines
Erosion Control	FishNet4C	A-223	Streambed Gravel
Vegetation Maintenance	CASQA Construction BMP Handbook	EC-2	Preservation of Existing Vegetation
Vegetation Maintenance	CASQA Construction BMP Handbook	EC-4	Hydroseeding
Vegetation Maintenance	FishNet4C	A-67	Broadcast Seeding
Vegetation Maintenance	FishNet4C	A-69	Hydroseeding
Vegetation Maintenance	FishNet4C	A-73	Planting
Velocity Reduction	CASQA Construction BMP Handbook	EC-10	Velocity Dissipation Device
Velocity Reduction	CASQA Construction BMP Handbook	SE-10	Storm Drain Inlet Protection
Velocity Reduction	FishNet4C	A-43	Energy Dissipater
Water Diversion	FishNet4C	A-151	Cofferdam
Water Diversion	FishNet4C	A-157	Dewatering
Water Diversion	FishNet4C	A-161	Fish Exclusion
Water Diversion	FishNet4C	A-163	Level Spreader
Water Diversion	FishNet4C	A-167	Sandbag
Water Diversion	FishNet4C	A-179	Stream Bypass (water diversion)

APPENDIX G

CEQA DOCUMENTS

NOTICE OF DETERMINATION
Marin County Environmental Coordination and Review

FILED

OCT 22 2007

MICHAEL J. SMITH
MARIN COUNTY CLERK
By: J. Whitney, Deputy

TO: ☒ Office of Planning and Research
☒ County Clerk, County of Marin

FROM: Marin County Department of Public Works
(Lead Agency)

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title: Easkoot Creek Sediment Removal at Bridget Crossings
State Clearinghouse # 2007-092065
Contact Person: Kallie Kull, Senior Planner
Assessor's Parcel: N/A **Application: Sediment Removal**

Project Location: The project area is on Easkoot Creek, which runs through the town of Stinson Beach and discharges into the Bolinas Lagoon downstream of Calle del Arroyo. Driving directions; From Highway 101, just north of the Golden Gate bridge in San Francisco, take the Highway 1 north exit towards Mill Valley/Stinson Beach. Stay straight on Highway 1, veering right as needed to the Town of Stinson Beach (approximately 12 miles). Proceed north on Highway One and at the north end of town to find the intersections of the Calles with Highway 1. Turn left on the individual Calles to the bridges and project sites that cross Easkoot Creek.

Project Description: Sediment will be removed from the creek channel immediately upstream and downstream of six bridge crossings of Easkoot Creek with Arenal Ave., Calle del Pinos. Calle del Pradero, Calle del Sierra, Calle del Onda, and Calle del Arroyo. The area to be dredged will be no more than 400 square feet at each crossing, extending no more than 20 feet up or downstream from the bridge crossings and the amount of material removed will be no more than 20 cubic yards per crossing. The project will take place during late summer, no later than Oct. 31, at times of lowest water, so as to minimize any potential impact on salmon and steelhead that may be present in the project area. Should any fish be present on site, a State and/or NMFS certified fisheries biologist will be on-site to block net the creek and relocate the fish upstream. A creek biologist from the County will also be on-site the entire time during the project to ensure that the work is being done according to conditions set forth in the California Fish and Game 1600 Streambed Alteration Agreement conditions. All work will be done from the bank and no equipment will be placed in the creek. All sediment removed from the creek will be transported to a legal upland spoils disposal site.

This is to advise that the Marin County Department of Public Works Director approved the above-described project on October 19, 2007, and has made the following determinations regarding the above described project:

1. The project in its approved form will not have a significant effect on the environment.
2. A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures were not made a condition of the approval of the project.
4. Findings were made pursuant to the provisions of CEQA.

I certify that a copy of the Negative Declaration of Environmental Impact, and record of project approval is on file and may be examined at:
Agency: Marin County Department of Public Works

Address: 3501 Civic Center Drive, Room 304
San Rafael, CA 94903-4112

By: _____
Farhad Mansourian, Director, Department of Public Works

Date: 10/22/07

The filing of this Notice of Determination starts a 30 day statute of limitations on court challenges to the approval under CEQA.

VII. PROJECT SPONSER'S INCORPORATION OF MITIGATION MEASURES:

Acting on behalf of the project sponsor or the authorized agent of the project sponsor, I (undersigned) have reviewed the Initial Study for the Easkoot Creek Sediment Removal, Stinson Beach, CA and have particularly reviewed the mitigation measures and monitoring programs identified herein. I accept the findings of the Initial Study, including the recommended mitigation measures, and hereby agree to modify the proposed project application4s now on file with Marin County to include and incorporate all mitigation measures and monitoring programs set out in this Initial Study.

Farhad Mansourian — 10-22-07

(Project Sponsor's Name or Representative) — Date

(Project Sponsor's Name or Representative) — Date

VII. DETERMINATION: Pursuant to Sections 15081 and 15070 of the State Guidelines, the foregoing Initial Study evaluation, and the entire administrative record for the project:

[X] I find that the proposed project WILL NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

[ ] I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

[ ] I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Signature _____ Date 9/13/07

Printed Name Tim Haddad Date September 13, 2007

MARIN COUNTY COMMUNITY DEVELOPMENT AGENCY
PLANNING DIVISION

INITIAL STUDY
Easkoot Creek Sediment Removal

I. BACKGROUND

A. Project Sponsor's Name and Address: Marin County Dept. of Public Works
3501 Civic Center Dr., Room 304
San Rafael, CA 94903

B. Lead Agency Name and Address: Marin County Dept. of Public Works
3501 Civic Center Dr., Room 304
San Rafael, CA 94903

C. Contact Person and Phone Number: Kallie Kull, Senior Planner, (415) 499-6532

II. PROJECT DESCRIPTION

A. Project Title: Easkoot Creek Sediment Removal

B. Type of Application(s): Flood Control Project

C. Project Location: Bridge crossings over Easkoot Creek on Arenal Ave., Calle del Pinos. Calle del Pradero, Calle del Sierra, Calle del Onda, and Calle del Arroyo, within the Town of Stinson Beach.

D. General Plan Designation: The project site is located within the mapped Coastal Recreation Corridor of the Marin Countywide Plan (CWP) and has a land use designation of C-SF3 (Coastal, Single Family, one unit per one acre to five acres). The CWP Environmental Quality Element designates the Stinson Beach area as an important Environmental Corridor and Resource Conservation Area.

E. Zoning: C-MF2 1-4 units per acre

F. Description of Project:

Existing Project Site
The project area is on Easkoot Creek, which runs through the town of Stinson Beach and discharges into the Bolinas Lagoon downstream of its intersection Calle del Arroyo. Sediment will be removed from the creek channel immediately upstream and downstream of six bridge crossings of Easkoot Creek with Arenal Ave., Calle del Pinos. Calle del Pradero, Calle del Sierra, Calle del Onda, and Calle del Arroyo. The area to be dredged will be no more than 400 square feet at each crossing, extending no more than 20 feet up or downstream from the bridge crossings and the amount of material removed will be no more than 20 cubic yards per crossing.

Background
In the early 1950's a large landslide occurred in a canyon just above Stinson Beach on Golden Gate National Recreation (GGNRA) lands, which deposited a vast amount of loose material in the bed of one of the tributaries to Easkoot Creek. This material began washing down the steep canyon and into the flat reach of Easkoot Creek, where it promptly deposited out, thereby greatly reducing the capacity of the

creek to convey high flows during winter storms. Thereafter, to maintain the channel capacity and reduce flooding in the town of Stinson Beach, accumulated sediment has been removed periodically from the creek by County Public Works, State Division of Beaches and Parks, and the Corps of Engineers. The creation of Marin County Zone 5 Flood Control District was based solely on this observed need for sediment removal from Easkoot Creek.

On January 1, 2006, a large quantity of sediment washed down into Easkoot Creek during the New Year's Eve flood, causing great concern for further flooding of the adjacent residences in the town of Stinson Beach. In October 2006, in order to address this concern, the County of Marin Public Works Department removed sediment from the channel under five bridge crossings of Easkoot Creek with Calle del Pinos, Calle del Pradero, Calle del Sierra, Calle del Onda, and Calle del Arroyo. The objective of this work was to increase channel capacity and thereby reduce the potential frequency of flooding. This work, completed in October 2006 was permitted under a California State Fish and Game 1600 Streambed Alteration Agreement, with a Statutory Exemption under CEQA Section 15269 Emergency Projects as per declaration of the site as a disaster area by the Governor of California.

Proposed Project Description

Since October 2006, sediment has continued to wash down into the creek channel from the upper landslide into the already severely aggraded channel. The Marin County Flood Control Zone 5 Advisory Board has requested, and the community expressed a need for, the County Public Works crews to remove accumulated sediment in the channel before the 2007-2008 rainy season begins. The objective of the proposed work is to lower the aggraded channel bed and increase flow capacity at the bridge crossings during high storm events. The County of Marin Public Works Department is proposing to remove sediment at six locations, under the bridge crossings of Easkoot Creek with Arenal Ave., Calle del Pinos, Calle del Pradero, Calle del Sierra, Calle del Onda, and Calle del Arroyo. The proposal is for a one year sediment removal effort coupled with monitoring by Marin County Water Conservation and Flood Control District, to assess the effectiveness of this activity on channel bed elevation and flood flow capacity.

The following conditions will be met during the proposed sediment removal project:

- The project will take place during late summer, no later than Oct. 31, at times of lowest water, so as to minimize any potential impact on salmon and steelhead that may be present in the project area. Should any fish be present on site, a State and/or NMFS certified fisheries biologist will be on-site to block net the creek and relocate the fish upstream. A creek biologist from the County will also be on-site the entire time during the project to ensure that the work is being done according to conditions set forth in the California Fish and Game 1600 Streambed Alteration Agreement conditions.

- Sediment removal will take place only immediately upstream and downstream of the crossings of Easkoot Creek with Arenal Ave., Calle del Pinos, Calle del Pradero, Calle del Sierra, Calle del Onda, and Calle del Arroyo. Work will begin at the lowest crossing, moving upstream, to minimize the effects of turbidity on upstream reaches.

- All work will be done from the bank and no equipment will be placed in the creek.

- At each location the total area involved, both up and downstream, will be no more than 400 square feet, extending no more than 20 feet up or downstream from the bridge crossing, and the amount of material removed will be no more than 20 cubic yards per crossing.

- All sediment removed from the creek will be transported to a legal upland spoils disposal site.

- The Marin County Water Conservation and Flood Control District, will conduct monitoring to assess the effectiveness of this activity on channel bed elevation and flood flow capacity.

- The overall impact to the channel in the project reach will be monitored by staff of the Marin County Flood Control District, who will collect channel topography data in order to access whether sediment removal on an annual basis is warranted for flood control purposes. Changes in channel morphology will be documented at three points in time: 1) before any sediment removal has occurred, 2) immediately after the work has been completed and before the onset of winter storms, and 3) following the winter rainy season of 2007-2008.

- A long term, comprehensive solution to the flooding issue in the Community of Stinson Beach is being developed by the County of Marin Flood Control District in collaboration with the Community of Stinson Beach and the Golden Gate National Recreation Area.

III. CIRCULATION AND REVIEW

A. Responsible Agencies: *(agencies whose approval is required and permits needed)*

- California Department of Fish and Game- 1600 Streambed Alteration Agreement

DOCUMENTS INCORPORATED BY REFERENCE

1) Marin Countywide Plan, CDA- Planning Division (1994)

2) Easkoot Creek Restoration at Stinson Beach- Environmental Assessment U.S. Dept of the Interior National Park Service; Golden Gate National Recreation Area.

3) California Department of Fish and Game Streambed Alteration Agreement for Sediment Removal in Easkoot Creek (October 2006)

4) Conversation with Jeremy Sarrow, Department of Fish and Game biologist. August 22, 2007

5) National Marine Fisheries Service Protected Resources- Marin County database.

IV. EVALUATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to Section 15063 of the State CEQA Guidelines, and the County EIR Guidelines, Marin County will prepare an Initial Study for all projects not categorically exempt from the requirements of CEQA. The Initial Study evaluation is a preliminary analysis of a project which provides the County with information to use as the basis for deciding whether to prepare an Environmental Impact Report (EIR) or Negative Declaration. The points enumerated below describe the primary procedural steps undertaken by the County in completing an Initial Study checklist evaluation and, in particular, the manner in which significant environmental effects of the project are made and recorded.

A. The determination of significant environmental effect is to be based on substantial evidence contained in the administrative record and the County's environmental database consisting of factual information regarding environmental resources and environmental goals and policies relevant to Marin County. As a procedural device for reducing the size of the Initial Study document, relevant information sources cited and discussed in topical sections of the checklist evaluation are incorporated by reference into the checklist (e.g. general plans, zoning ordinances). Each of these information sources has been assigned a number which is shown in parenthesis following each topical question and which corresponds to a number on the data base source list provided herein as Attachment 1. See the sample question below. Other sources used or individuals contacted may also be cited in the discussion of topical issues where appropriate.

B. In general, a Negative Declaration shall be prepared for a project subject to CEQA when either the Initial Study demonstrates that there is no substantial evidence that the project may have one or more significant effects on the environment. A Negative Declaration shall also be prepared if the Initial Study identifies potentially significant effects, but revisions to the project made by or agreed to by the applicant prior to release of the Negative Declaration for public review would avoid or reduce such effects to a level of less than significance, and there is no substantial evidence before the Lead County Department that the project as revised will have a significant effect on the environment. A signature block is provided in Section VII of this Initial Study to verify that the project sponsor has agreed to incorporate mitigation measures into the project in conformance with this requirement.

C. All answers to the topical questions must take into account the whole of the action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts. Significant unavoidable cumulative impacts shall be identified in Section VI of this Initial Study (Mandatory Findings of Significance).

D. A brief explanation shall be given for all answers except "Not Applicable" answers that are adequately supported by the information sources the Lead County Department cites in the parenthesis following each question. A "Not Applicable" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "Not Applicable" answer shall be discussed where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

E. "Less-than-significant Impact" is appropriate if an effect is found to be less-than-significant based on the project as proposed and without the incorporation of mitigation measures recommended in the Initial Study.

F. "Potentially Significant Unless Mitigated" applies where the incorporation of recommended mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less-than-significant Impact." The Lead County Department must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from Section V, "Earlier Analyses", may be cross-referenced).

G. "Significant Impact" is appropriate if an effect is significant or potentially significant, or if the Lead County Department lacks information to make a finding that the effect is less-than-significant. If there are one or more effects which have been determined to be significant and unavoidable, an EIR shall be required for the project.

H. The answers in this checklist have also considered the current California Environmental Quality Act Guidelines and the Initial Study Checklist contained in those Guidelines.

V. ISSUES (and Supporting Information Sources, see Attachment A)):

1. LAND USE AND PLANNING. *Would the proposal:*

a) **Conflict with applicable Countywide Plan designation or zoning standards?** (**source #(s):** Countywide Plan (1994))	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

The determinations of policy consistency as discussed in this Initial Study section represent County staff interpretation of policies. However, this Initial Study does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

Policy inconsistencies may not necessarily indicate significant environmental effects. Section 15358(b) of the CEQA Guidelines states that "effects analyzed under CEQA must be related to a physical change in the environment." Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environmental are considered significant impacts pursuant to CEQA. Where potentially significant environmental impacts are raised in the discussion below, they have been mitigated to a less-than-significant impact and, therefore, project activities are determined to be consistent with the relevant policies cited. Mitigations are addressed further in the topical impact sections following plan policy analyses.

LOCAL PLANS, POLICIES, AND REGULATIONS

Land use designations and development of the project site are governed by the objectives and policies of the Marin Countywide Plan (CWP), the Local Coastal Program (LCP), Unit I, the Stinson Beach Community Plan (Community Plan), and Title 22 (Zoning) of the Marin County Code.

The proposed project is maintenance in nature, and will not change the Land Use Designations at the project site or conflict with zoning standards or the objectives of the above mentioned plans in any way, therefore the project will be consistent with Applicable Countywide Plan designation or zoning standards.

b) **Conflict with applicable environmental plans or policies adopted by Marin County?** Countywide Plan (1994)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The Marin Countywide Plan

Specific Countywide Plan policies which pertain to the proposed project include the following subjects:
(1) Protection of riparian systems; (Policy EQ-2.1)
(2) Protection of Stream Conservation Areas; (Policies EQ 2.2, 2.4, 2.5, 2.11)
(3) Species and habitat preservation; (Policies EQ-2.87, 2.88, 3.6)
(4) Prevention of air, water, and noise pollution; (Policy EQ 3.2)
(5) Avoidance of hazards; (Policy EQ- 3.7)
(6) Protection of trees; (Policy EQ 3.14)
(7) Minimization of grading activities; (Policy EQ-3.16)
(8) Protection of archeological resources; (Policy EQ-3.29)
(9) Compliance with the Stinson Beach Community Plan and Local Coastal Program elements.

1) Protection of Riparian Systems

Policy EQ-2.1 Value of Riparian Systems. Riparian systems, streams and their riparian and woodland habitat are irreplaceable and should be officially recognized and protected as essential environmental resources, because of their values for erosion control, water quality, fish and wildlife, aesthetics, recreation, and the health of human communities.

Consistent:
As discussed in Sections V. 4. (c) and V. 7. (a., b, c), the proposed sediment removal will be confined to the stream channel itself and all work will be conducted from the bridges and top of bank, avoiding encroachment into the riparian corridor. All native riparian vegetation will be protected and not disturbed by heavy equipment or dredging activities. A biologist from the County will be present at the project site during the operation to ensure that no heavy equipment enters into the riparian corridor and that all sediment removed from the channel is disposed of in an upland spoils storage site. Therefore the project will be consistent with Policy EQ-2.1.

(2) Protection of Stream Conservation Areas

Policy EQ-2.2, Streamside Conservation Areas; states that all perennial and intermittent streams, which are defined as natural watercourses shown as solid or dashed blue lines on the most recent appropriate USGS quad sheet, should be subject to stream and creekside protection policies. A perennial stream is further defined as: "a watercourse that flows throughout the year (except for infrequent or extended periods of drought), although surface water flow may be temporarily discontinuous in some reaches of the channel such as between pools."

Policy EQ 2.4 defines permitted land uses within the SCA, including:

- all currently existing structures and uses including reconstruction and repairs;
- necessary water supply projects
- flood control projects
- projects to improve fish and wildlife habitat
- grazing of livestock and other agricultural uses
- maintenance of water channels for erosion control and other purposes;
- road and utility crossings
- water monitoring installations
- trails

Consistent: Easkoot Creek is by definition a blue line stream (see attached USGS Quad map) and as such, is subject to protection under the Stream Conservation Area protection policies as set forth in the Countywide Plan. As discussed in V Section 3. (c) and V. 11. (d, e), the proposed project is a flood control project entailing maintenance of a water channel for flood control purposes, and thus is a permitted activity within the SCA, as set forth in the Countywide Plan EQ 2.4. Therefore the project will be consistent with Policy EQ-2.4.

Policy EQ-2.5 Prohibited Land Uses in Stream Conservation Areas (SCAs). The following new uses are prohibited in the SCA:

- roads and utility lines, except at crossings
- confinement of livestock
- dumping or disposal of refuse
- use of motorized recreational vehicles
- any structural improvement (excluding repairs) other than those identified in Policy EQ-2.4, including residences, barns, and storage buildings, unless allowed by a development permit in Policy EQ-2.6.

Consistent: The proposed project does not implement any of the activities listed as prohibited within the SCA. Therefore the project will be consistent with Policy EQ-2.5.

Policy EQ-2.11 Modifications of natural channels within SCAs for flood control, etc., should be done in a manner that retains and protects the vegetation forming ground cover and shade. Special attention should be given to the protection of riparian vegetation.

Consistent. As discussed in Section 3. (b, c), 4. (b, c), V. 7 (a, b, c), and V. 11 (d,e), all sediment removal will be confined to the stream channel itself and all work will be conducted from the bridges and top of bank, avoiding encroachment into the riparian corridor. All native riparian vegetation will be protected and not disturbed by heavy equipment or dredging activities. A biologist from the County will be present at the project site during the operation to ensure that no heavy equipment enters into the riparian corridor and that all sediment removed from the channel is disposed of in am upland spoils storage site. Therefore the project will be consistent with Policy EQ-2.11.

(3) Species and Habitat Preservation

Policy EQ-2.87 Species Preservation in the Environmental Review Process. Environmental review of development applications shall consider the impact of the proposed development on species and habitat diversity.

Policy EQ-2.88 Protection of Special Status Species. Development shall be restricted or modified in areas which contain special status species and migratory species of the Pacific Flyway and/or significant natural areas, wetlands, riparian habitats, and freshwater habitats, to ensure the continued health and survival of these species and areas

Policy EQ-3.6 Wildlife, Vegetation, and Habitats. A diversity and abundance of wildlife and marine life shall be maintained. Vegetation and animal habitats shall be preserved wherever possible.

Consistent: As discussed in detail in Sections V. 7 (a, b, c), the proposed project, will adhere to the conditions outlined in that section, ensuring that the project would have less-than-significant impacts on all special-status species, wildlife and habitat diversity. Therefore the project will be consistent with Policy EQ-2.87, 2.88, and 3.6.

(4) Prevention of Air, Water, and Noise Pollution

Policy EQ-3.2. Air, Water, and Noise Pollution. Air, water, and noise pollution shall be prevented or minimized.

Air Pollution
The affects on air quality are from exhaust coming from heavy equipment during dredging. The impacts are short term and temporal, lasting less than a week and moving between six different locations during that time. Consequently the proposed project is consistent with Policy EQ-3.2, and the proposed project would not result in potentially significant impacts on air quality.

Water Pollution
There will be a temporary increase in turbidity in the creek as sediment is disturbed from the dredging process. These impacts will be short-term and localized, expected to last less than a day in any one location. The work will begin at the most downstream crossing and continue upstream to minimize impacts to the aquatic environment from siltation. Given these circumstances, the impacts from siltation to the creek are expected to be less-than-significant.

Noise

The noise associated with sediment removal activities is limited to the sound of heavy equipment working during normal working hours. The project is short term (less than one week), and the work is located in the creek zone, a distance away from the nearest residence.

Consistent. As discussed in Sections 3. (b), V. 4 (b, c), and V. (a), The project would contribute minimally to air, water, and noise pollution to the extent analyzed in this Initial Study. No significant effects related to air, water, or noise pollution are identified. Therefore, the project would be consistent with this policy. Therefore the project will be consistent with Policy EQ- 3.2.

(5) Avoidance of Hazards

Policy EQ-3.7 Avoidance of Hazards from Earthquake, Erosion, Landslide, Floods, and Fires.

Consistent. As discussed in Section V. 3. (a)The project is maintenance in nature, lasting less than a week in duration, therefore the likelihood of impacts from an earthquake, flood or fire are minimal. The project will be implemented during the dry season, thus avoiding potential impacts from the landslide in the upper watershed. Since the project is a flood control project, removal of aggraded sediment should have a positive effect on the avoidance of flood flows into adjacent neighborhoods. Therefore the project will be consistent with Policy EQ-3.7.

(6) Protection of Trees

Policy EQ-3.14 Protection of Trees. The County shall strive to protect large trees, trees with historical importance, and oak woodland habitat, and prevent the untimely removal of trees through implementation of tree preservation ordinance.

Consistent. No large trees, trees with historic importance, or oak woodland habitat will be removed during the project. As discussed in Sections V. 4. (c) and V. 7. (a., b, c), the proposed sediment removal will be confined to the stream channel itself and all work will be conducted from the bridges and top of bank, avoiding encroachment into the riparian corridor. All native riparian vegetation will be protected and undisturbed by heavy equipment or dredging activities. Therefore the project will be consistent with Policy EQ- 3.14.

(7) Minimization of Grading Activities

Policy EQ-3.16. Minimize Excavation, Grading, and Filling. New development in the County shall adhere to the standards of the Department of Public Works in order to minimize excavating, grading, and filling, while allowing for adequate access.

Consistent. As discussed in Sections V. 3 (a, b, c), the objective of the proposed project is flood control only, and is not subject to a development or grading permit. However, the area to be excavated at each site is limited to no more than 400 square feet in area, extending no more than 20 feet up or downstream from the bridge crossing, and the amount of material removed will be no more than 20 cubic yards per crossing. This is the minimal area needed to clear the bridges of sediment aggradation, while not extending the dredging further up or downstream from the bridges. The excavated area will be confined to the channel bottom itself and will not encroach into the streamside area or impact native riparian vegetation in any way. Therefore the project is consistent with Policy EQ-3.16.

(8) Protection of Archeological Resources

Policy EQ-3.29. Review Sensitivity Maps. The Planning Department shall review the archaeological sensitivity map for all development applications in order to determine potential impacts.

Consistent. As discussed in Sections V. 14 (a, b), the proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream system, and the area to be dredged has been dredged numerous times before in the same locations, with no known artifacts found. Should any cultural resources be discovered during this round of dredging, all work shall immediately be stopped and the services of a qualified archaeologist from Sonoma State University Cultural Resources Department shall be engaged to assess the value of the resource and to develop appropriate mitigation measures. These measures will ensure that the proposed project would result in less-than-significant impacts to cultural resources and, therefore, be consistent with Policy EQ-3.29.

(9) Compliance with Local Community Plan and Local Coastal Program

Stinson Beach Community Plan (1985)

The Stinson Beach Community Plan contains specific goals, policies, and programs that govern conservation and development in the unincorporated community of Stinson Beach. The principle goals of the plan include the following:

THEREFORE THE FOLLOWING THREE GOALS ARE OF PARAMOUNT IMPORTANCE (Stinson Beach Community Plan 1984). :

a. The rural atmosphere and individualistic character of the town must be preserved as a prime consideration;
b. The relative safety, security, and privacy of the residents must be maintained and improved;
c. The Stinson Beach Village Association, a monitor organization, must actively pursue the general goals and specific policies of this plan and endeavor to represent the best interests of the town.

Consistent. The proposed project is consistent with the Stinson Beach Community Plan Goals (1985) as described below. The project serves to fulfill Goal #2, as a flood control project helping to maintain the relative safety and security of the residents of Stinson Beach. Therefore the proposed project would be consistent with all relevant Stinson Beach Community goals.

Local Coastal Program, Unit I

Consistent. The Countywide Plan specifies that land use in the Coastal Zone shall be subject to the provisions of the LCP in addition to the Countywide Plan land use designations (CWP Policy CD-8.10). As discussed above in Section V. 1 (a), the land use designations will not be altered because of this project, therefore the proposed project would be consistent with relevant policies in the Marin County Local Coastal Plan (LCP), Unit I.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Affect agricultural resources, operations, or contracts (e.g. impacts to soils or farmlands, impacts from incompatible land uses, or conflicts with Williamson Act contracts)? (source #(s): Countywide Plan (1994)	[ ]	[ ]	[ ]	[X]

The project does not involve nor is associated with any form of agricultural resources, operation or conflicts; therefore this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
d) Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)? (source #(s): Countywide Plan (1994)	[ ]	[ ]	[ ]	[X]

The nature of the project will not divide or affect the physical arrangement of the established community; therefore this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
e) Result in substantial alteration of the character or functioning of the community, or present or planned use of an area? (source #(s): Countywide Plan (1994)	[ ]	[ ]	[ ]	[X]

The nature of the project will not alter the character or function of the community and will actually be a benefit to the community by reducing the potential frequency of flooding, therefore, the project will result in less-than-significant impacts.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
f) Substantially increase the demand for neighborhood or regional parks or other recreational facilities, or affect existing recreational opportunities? (source #(s): Countywide Plan (1994)	[ ]	[ ]	[ ]	[X]

The project is maintenance in nature and will not increase demand for parks or other facilities; therefore this is a less-than-significant impact.

2. POPULATION AND HOUSING. ***Would the proposal:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Increase density that would exceed official population projections for the planning area within which the project site is located as set forth in the Countywide Plan and/or community plan? (source #(s): Countywide Plan (1994)	[ ]	[ ]	[ ]	[X]

The project will not have an effect on population due to the fact that it is maintenance in nature; therefore this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or extension of major infrastructure)? (source #(s): Countywide Plan (1994)	[ ]	[ ]	[ ]	[X]

The project will not have an effect on growth due to the fact that it is maintenance in nature, consequently, the project will result in less-than-significant impacts.

c) Displace existing housing, especially affordable housing? **(source #(s):** Countywide Plan (1994)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

The project does not displace existing housing of any kind; therefore, the project will result in a less-than-significant impact.

3. GEOPHYSICAL. ***Would the proposal result in or expose people to potential impacts involving:***

a) Location in an area of geologic hazards, including but not necessarily limited to: 1) active or potentially active fault zones; 2) landslides or mudslides; 3) slope instability or ground failure; 4) subsidence; 5) expansive soils; 6) liquefaction; 7) tsunami ; or 8) similar hazards? **(source #(s):**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Review of resource maps maintained by the Marin County Community Development Agency indicate that the subject property is not located in an area of geologic hazards as indicated on Geologic Hazards Map for Unit I of the Local Coastal Program. In addition, the subject property is not located within the delineated boundaries of the San Andreas Fault zone as identified by the Alquist-Priolo Special Studies Zone Act. Consequently, the project will result in less-than-significant impacts.

b) Substantial erosion of soils due to wind or water forces and attendant siltation from excavation, grading, or fill? **(source #(s):**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The only sediment that will be excavated is below water line and will be removed to a designated upland spoils location area, and thus will not be exposed to erosive forces such as wind or water. There will be no excavating or grading of adjacent streambanks, and no fill involved in the project. There will be a temporary increase in turbidity in the creek as sediment is disturbed from the dredging process. These impacts will be temporary and expected to last less than a day in any one location. The work will begin at the most downstream crossing and continue upstream to minimize impacts to the aquatic environment from siltation. Given these circumstances, the impacts from siltation to the creek are expected to be less-than-significant.

c) Substantial changes in topography from excavation, grading or fill, including but not necessarily limited to: 1) ground surface relief features; 2) geologic substructures or unstable soil conditions; and 3) unique geologic or physical features? **(source #(s)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

A localized change in channel topography will occur through the removal of sediment on both sides of the bridges in six locations. The long term objective of the project is to lower the channel bed elevation in the project reach to increase flow capacity and decrease the potential frequency of flooding. The County is

proposing to monitor channel conditions before and after the activity to assess whether this long term objective is being met. Given the nature of the project, the change in channel topography is a desired outcome. Given that the sediment to be removed is caused by deposition into the creek from the landslide in the upper watershed, the impact to the creek channel from excavation should be positive in nature. Consequently, the project will result in less-than-significant impacts.

4. WATER. ***Would the proposal result in***:

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantial changes in absorption rates, drainage patterns, or the rate and amount of surface runoff? (source #(s):	[ ]	[ ]	[X]	[ ]

Drainage patterns and rate of surface run-off into the creek from the upper watershed and adjacent neighborhoods will remain unaltered. The removal of sediment from the channel will increase channel ability to carry surface run-off during high flood flows. If the channel has greater capacity, and the creek remains in its channel during high flows, the flooding pattern should improve in the adjacent Stinson Beach neighborhoods. Consequently, the project will result in less-than-significant impacts.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Exposure of people or property to water related hazards, including, but not necessarily limited to: 1) flooding; 2) debris deposition; or 3) similar hazards ? (source #(s):	[ ]	[ ]	[X]	[ ]

By removing sediment from the channel at each bridge crossing, the channel bed elevation will be lowered, thus improving flow capacity and decreasing the threat of potential flooding in adjacent neighborhoods. The project will also improve the passage of wood and other debris under the bridges, aiming to avoid flood hazards caused by debris deposition at the bridges during high flows. The overall impact of the project on flood hazards and debris deposition is a beneficial effect of the project. Consequently, the project will result in less-than-significant impacts.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Discharge of pollutants into surface or ground waters or other alteration of surface or ground water quality (e.g. temperature, dissolved oxygen or turbidity)? (source #(s):	[ ]	[ ]	[X]	[ ]

There will be a temporary increase in turbidity in the creek as sediment is disturbed from the dredging process. These impacts will be short-term and localized, expected to last less than a day in any one location. The work will begin at the most downstream crossing and continue upstream to minimize impacts to the aquatic environment from siltation. Any fish in the project area will have been relocated upstream before work begins, and thus not subject to turbid conditions. Given these circumstances, the impacts from siltation to the creek are expected to be less-than-significant.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
d) Substantial change in the amount of surface water in any water body or ground water either through direct additions or withdrawals, or through intersection of an aquifer by cuts or excavations? (source #(s):	[ ]	[ ]	[X]	[ ]

The amount of surface water in the channel will remain unaltered. No addition or withdrawal will occur due to the project. Consequently, the project will result in less-than-significant impacts.

e) Substantial changes in the flow of surface or ground waters, including, but not necessarily limited to: 1) currents; 2) rate of flow; or 3) the course or direction of water movements? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The natural direction and rate of flow of the creek will remain unchanged. There may be a decrease in flood flows coming from the creek into the adjacent neighborhood, as the channel capacity is increased, which is the objective of the project. Therefore, this is a less-than-significant impact.

f) Substantial reduction in the amount of water otherwise available for public water supplies? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

The project will not reduce water supply amount, therefore, this is a less-than-significant impact.

5. AIR QUALITY. ***Would the proposal:***

a) Generate substantial air emissions that could violate official air quality standards or contribute substantially to an existing or projected air quality violation? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the project. Since the work will occur out in the open air and over a short duration (2-3 days), the impact on air quality will be less-than-significant. Consequently, the project will result in less-than-significant impacts.

b) Expose sensitive receptors to pollutants, such as noxious fumes or fugitive dust? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the project. Since the work will occur out in the open air and over a short duration (2-3 days), the impact to sensitive receptors will be less-than-significant.

c) Alter air movement, moisture, or temperature, or cause any change in climate? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

No alterations in climate will occur as a result of sediment removal activities, therefore, this is a less-than-significant impact.

d) Create objectionable odors? (source #(s): *Countywide Plan (1994)*	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The only odors that will be produced will come from the exhaust fumes from the heavy equipment used for the project. Since the work will occur out in the open air and over a short duration (2-3 days), the impact from objectionable odors will be less-than-significant.

6. TRANSPORTATION/CIRCULATION. ***Would the proposal result in:***

a) Substantial increase in vehicle trips or traffic congestion such that existing levels of service on affected roadways will deteriorate below acceptable County standards? (source #(s): Countywide Plan (1994)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Each bridge crossing may be temporarily closed for a limited number of hours during sediment removal activities. Ingress and egress to the neighborhood during sediment removal activities is available on adjacent streets within the Town of Stinson Beach. Alternative routes will be marked clearly with County of Marin traffic control signs. The level of service on affected roadways will not drop below acceptable County standards. Therefore, this is a less-than-significant impact.

b) Traffic hazards related to: 1) safety from design features (e.g. sharp curves or dangerous intersections); 2) barriers to pedestrians or bicyclists; or 3) incompatible uses (e.g. farm equipment)? (source # (s) Countywide Plan (1994)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Each bridge crossing roadway may be closed off during work with standard County Public Works signage. Ingress and egress to the neighborhood during sediment removal activities is available on adjacent streets within the Town of Stinson Beach. Alternative routes will be marked clearly with County of Marin traffic control signs. Neighbors will have access to their properties during the maintenance period. Therefore, this is a less-than-significant impact.

c) Inadequate emergency access or access to nearby uses? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Ingress and egress to the neighborhood during sediment removal activities is available on adjacent streets within the Town of Stinson Beach. Alternative routes will be marked clearly with County of Marin traffic control signs. Emergency vehicles will have continual access to local residences during the maintenance period. Therefore, this is a less-than-significant impact.

d) Insufficient parking capacity on-site or off-site? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

Due to the temporary maintenance nature of the project, no additional parking will be required; therefore, this is a less-than-significant impact.

e) **Substantial impacts upon existing transportation systems, including rail, waterborne or air traffic systems? (source #(s):** *Countywide Plan (1994)*	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Due to the temporary maintenance nature of the project, no substantial impacts upon existing transportation systems will occur on or around the site. Minor road closures may be required during the project, with the community being properly notified and no access to property denied during the sediment removal process. Therefore, this is a less-than-significant impact.

7. BIOLOGICAL RESOURCES. *Would the proposal result in:*

a) **Reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats including, but not necessarily limited to: 1) plants; 2) fish; 3) insects; 4) animals; and 5) birds listed as special-status species by State or Federal Resource Agencies? (source #(s):** *#2,3,4,5*	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The channel in its existing condition is highly aggraded, filled in with material from the landslide on GGNRA lands in the upper watershed. The existing aggradation is likely having a number of negative effects, including compromising habitat by filling of pools, impacting marcro-invertebrate populations and decreasing available shelter for fish and other aquatic inhabitants. The build-up of sediment below each bridge crossing increases the likelihood that wood and other debris would get caught on the bridges during high flows and thus be removed from the system by emergency crews. The removal of woody debris has a negative impact on the stream ecosystem by reducing stream complexity and shelter, as well as eliminating pool forming elements.

According to the County of Marin's biological database, derived from the Department of Fish and Game's California Natural Diversity Database (CNDDB) and additional data derived from an Environmental Assessment prepared by the Golden Gate National Recreation Area for restoration of Easkoot Creek, the only threatened or endangered species known to exist in the immediate project area include steelhead trout (Oncorhynchus mykiss) and coho salmon (Oncorhynchus kisutch). Per conversation with local Fish and Game biologist Jeremy Sarrow (8/22/07) and use of the National Marine Fisheries Service on-line database for fishery distribution in Marin County, coho salmon are not recognized as present in Easkoot Creek, although a very small number of fish may have occasionally strayed into the creek from the Bolinas Lagoon. No Northern Spotted Owl (Strix occidentalis caurina) are known to occur within the project area. No endangered plant species are known to exist on or around the immediate site either. In addition, no California red- legged frogs (Rana aurora draytonii), California fresh water shrimp (Syncaris pacifica) or Northwestern pond turtles (Clamnys marmorata marmorata) are known to exist on or near the immediate site. No occurrences for these species were noted during the CNDDB review.

In order to avoid any potential impact on salmonids that may be present in the creek, the following condition will be met. Therefore, this is a less-than-significant impact.

- All work will take place during October, at time of lowest water, but no later than October 31st in order to minimize exposure to potential rain storms.
- Work will begin at the most downstream crossing, moving upstream, to minimize the effects of turbidity on upstream reaches.

- Should any salmonids be present on site, a State and/or NMFS certified fisheries biologist will be on-site to block net the creek and move the fish upstream into clean water, upstream of the Arenal Ave. crossing.
- All sediment removal will be confined to the stream channel itself and all work will be conducted from the bridges and top of bank, avoiding encroachment into the riparian corridor.
- All native riparian vegetation will be protected from heavy equipment and dredging activities.
- All sediment removed from the site will be hauled away to an upland spoils storage site.
- A fisheries biologist will be on-site the entire time during working hours to ensure that the work is being done according to conditions set forth in the California Fish and Game 1600 Streambed Alteration Agreement conditions.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Substantial change in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur at any time throughout the year? (source #(s): *3, 4*	[ ]	[ ]	[X]	[ ]

The conditions outlined above in Section 7 (a) will be met during project implementation, as per recommendation from the West Marin Department of Fish and Game biologist who is issuing the 1600 permit for the project. A County creek biologist will be on-site during the entire project to ensure that these conditions are met. Therefore, no substantial change in animal or plant species, numbers or diversity is expected to result from the project; therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Introduction of new species of plants or animals into an area, or improvements or alterations that would result in a barrier to the migration, dispersal or movement of animals? (source #(s):	[ ]	[ ]	[X]	[ ]

The proposed sediment removal activities are intended to restore the site to a more natural channel condition and will not contribute to the introduction of plants or animals into the creek channel or adjacent streambanks. Removal of excessive sediment should help to open the channel and enhance migratory opportunities for fish and other aquatic organisms. Therefore, this is a less-than-significant impact.

8. ENERGY AND NATURAL RESOURCES. *Would the proposal result in:*

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantial increase in demand for existing energy sources, or conflict with adopted policies or standards for energy use? (source #(s): *Countywide Plan (1994)*	[ ]	[ ]	[ ]	[X]

Due to the maintenance nature of the project, no increase in demand for existing energy sources or standards for energy use will be affected. Therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Use of non-renewable resources in a wasteful and inefficient manner? (source #(s): *Countywide Plan (1994).*	[ ]	[ ]	[ ]	[X]

No use of non-renewable resources is necessary for this project; therefore, this is a less-than-significant impact.

c) Loss of significant mineral resource sites designated in the Countywide Plan from premature development or other land uses which are incompatible with mineral extraction? (source #(s): *Countywide Plan (1994);*	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

No significant mineral resources are found on the project site, therefore, this is a less-than-significant impact.

9. HAZARDS. ***Would the proposal involve:***

a) A risk of accidental explosion or release of hazardous substances including, but not necessarily limited to: 1) oil, pesticides; 2) chemicals; or 3) radiation)? (source #(s): *Countywide Plan (1994).*	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

No hazardous substances are known to exist on the project site nor will any be used during the sediment removal activities, therefore, this is a less-than-significant impact.

b) Possible interference with an emergency response plan or emergency evacuation plan? (source #(s): .	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The sediment removal activities will not interfere with an emergency response or evacuation plan. Bridge crossings will be closed temporarily during the day. In case of emergency all heavy equipment will be removed from the roadway immediately in order to allow vehicles to enter or leave the adjacent neighborhood. Heavy equipment deployed on the bridges can be removed in a matter of a few minutes during an emergency or evacuation. Therefore, this is a less-than-significant impact.

c) The creation of any health hazard or potential health hazard? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

The removal of sediment from the creek will not create any health hazards; therefore, this is a less-than-significant impact.

d) Exposure of people to existing sources of potential health hazards? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

The removal of sediment from the creek will not expose people to existing sources of health hazards; therefore, this is a less-than-significant impact.

e) Increased fire hazard in areas with flammable brush, grass, or trees? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

The project will have no effect on the fire hazard to the surrounding area; therefore, this is a less-than-significant impact.

10. NOISE. ***Would the proposal result in:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantial increases in existing ambient noise levels? (source #(s):	[ ]	[ ]	[X]	[ ]

There will be a temporary increase in ambient noise levels during normal working hour, from the heavy equipment used to remove sediment from the creek. The duration of the impact will be for a few days and the location of the increased noise will move from crossing to crossing as the work progresses. The noise impact is limited to the creek channel are, therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Exposure of people to significant noise levels, or conflicts with adopted noise policies or standards? (source #(s): *Countywide Plan (1994)*	[ ]	[ ]	[X]	[ ]

There will be an increase of noise levels during the one week of maintenance activities, but only for a temporary time as with any maintenance project. The increase in maintenance related noise levels would only occur during the County's adopted noise policy from 7am-6pm, Mon.-Fri. and not on holidays. Therefore, this is a less-than-significant impact.

11. PUBLIC SERVICES. ***Would the proposal have an effect upon, or result in a need for new or altered government service in any of the following areas:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Fire protection? (source #(s):	[ ]	[ ]	[ ]	[X]

The sediment removal project will not have an effect on fire protection; therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Police protection? (source #(s	[ ]	[ ]	[ ]	[X]

The sediment removal project will not have an effect on police protection; therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Schools? (source #(s):	[ ]	[ ]	[ ]	[X]

The sediment removal project will not have an effect on the local school; therefore, this is a less-than-significant impact.

d) Maintenance of public facilities, including roads? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The proposed project will positively affect the maintenance of County road crossings since it will increase the free board below each of the bridges and will decrease the risk of debris catching on the bridges, which can cause harm to the structures during high stream flows. The project should also decrease the potential frequency of flooding and consequential impacts on County roads; therefore, this is a less-than-significant impact.

e) Other governmental services? (source #(s):	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The County of Marin Flood Control District Zone 5 was established in Stinson Beach to assist the town in implementing flood control measures to protect residential and public facilities during high storm events. The County Flood Control District has historically achieved this objective by periodically removing sediment from Easkoot Creek when it has aggraded to the point of compromising flood carrying capacity. Enactment of the project will allow the Flood Control District the ability to provide these critical services for the Town of Stinson Beach residents. Therefore, this is a less-than-significant impact.

12. UTILITIES AND SERVICE SYSTEMS. ***Would the proposal result in a need for new systems, or substantial alterations to the following utilities:***

a) Power or natural gas? (source # (s): *Countywide Plan (1994)*	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

No alterations to power or natural gas will be required for the project; therefore, this is a less-than-significant impact.

b) Communications systems? (source # (s): *Countywide Plan (1994)*	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

No alterations to communications systems will be required by the project, therefore, this is a less-than-significant impact.

c) Local or regional water treatment or distribution facilities? (source #(s): *Countywide Plan (1994)*	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[ ]	[X]

No alterations to water treatment or distribution will be required by the project; therefore this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
d) Sewer or septic tanks? (source #(s): *Countywide Plan (1994*	[ ]	[ ]	[ ]	[X]

No alterations to sewer or septic tanks will be required by the project, therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
e) Storm water drainage? (source #(s)	[ ]	[ ]	[X]	[ ]

The storm water drainage system that carries water into Easkoot Creek from properties and roads within the Town of Stinson Beach, will not be negatively affected by the project. The project should have a positive affect on the ability of stormwater run-off to remain in the creek, since the project's objective is to increase channel carrying capacity, especially during peak storm events, therefore, this is a less-than-significant impact. See Section V. 4 Water.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
f) Solid waste disposal? (source #(s): *Countywide Plan; CF II.2*	[ ]	[ ]	[ ]	[X]

No alterations to solid waste disposal will be required by the project, therefore, this is a less-than-significant impact.

13. AESTHETICS/VISUAL RESOURCES. *Would the proposal:*

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantially reduce, obstruct, or degrade a scenic vista open to the public or scenic highway, or conflict with adopted aesthetic or visual policies or standards? (source #(s): *Countywide Plan (1994)*	[ ]	[ ]	[ ]	[X]

No alterations to scenic vistas will result from the project; therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Have a demonstrable negative aesthetic effect by causing a substantial alteration of the existing visual resources including, but not necessarily limited to: 1) an abrupt transition in land use; 2) disharmony with adjacent uses because of height, bulk or massing of structures; or 3) cast of a substantial amount of light, glare, or shadow? (source #(s): *Countywide Plan (1994)*	[ ]	[ ]	[ ]	[X]

No alterations to visual resources will result from the project; therefore, this is a less-than-significant impact.

14. CULTURAL RESOURCES. ***Would the proposal*:**

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Disturb paleontological, archaeological, or historical sites, objects, or structures? (source #(s): *Countywide Plan (1994)*	[ ]	[ ]	[X]	[ ]

No known cultural resources of these types are known to exist in the immediate project site, which has been periodically dredged numerous times over the years. Review of cultural resource maps maintained by the Marin Community Development Agency indicates that the subject properties are located in an area of low archaeological sensitivity. Field surveys of the subject properties did not reveal any evidence of historic domestic materials; therefore no further archaeological survey or monitoring is warranted for the proposed project. Since no human remains or archaeological resources are know on project site or immediate vicinity, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Have the potential to cause a physical change which would adversely affect unique ethnic cultural values, or religious or sacred uses within the project area? (source #(s): *Countywide Plan(1994)*	[ ]	[ ]	[X]	[ ]

No known ethnic, religious or sacred uses are known to exist on or near the project site.

15. SOCIAL AND ECONOMIC EFFECTS. ***Would the proposal result in:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
Any physical changes which can be traced through a chain of cause and effect to social or economic impacts. (source #(s):	[ ]	[ ]	[ ]	[X]

The restoration project will not result in any known physical changes to social or economic entities.

VI. MANDATORY FINDINGS OF SIGNIFICANCE. Pursuant to Section 15065 of the State EIR Guidelines, a project shall be found to have a significant effect on the environment if any of the following are true: *(Please explain your answer after each question*

		Yes	No	Maybe
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? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]
b)	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]
c)	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). *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]
d)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]

VII. PROJECT SPONSER'S INCORPORATION OF MITIGATION MEASURES:

Acting on behalf of the project sponsor or the authorized agent of the project sponsor, I (undersigned) have reviewed the Initial Study for the Easkoot Creek Sediment Removal, Stinson Beach, CA and have particularly reviewed the mitigation measures and monitoring programs identified herein. I accept the findings of the Initial Study, including the recommended mitigation measures, and hereby agree to modify the proposed project application4s now on file with Marin County to include and incorporate all mitigation measures and monitoring programs set out in this Initial Study.

_____ _____

(Project Sponsor's Name or Representative) Date

_____ _____

(Project Sponsor's Name or Representative) Date

VII. DETERMINATION: Pursuant to Sections 15081 and 15070 of the State Guidelines, the foregoing Initial Study evaluation, and the entire administrative record for the project:

[X] I find that the proposed project WILL NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

[ ] I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

[ ] I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Signature _____ Date _____

Printed Name _____ Date _____

ATTACHMENT A

INITIAL STUDY
ENVIRONMENTAL CHECKLIST FORM

DOCUMENTS INCORPORATED BY REFERENCE

6) Marin Countywide Plan, CDA- Planning Division (1994)

7) Easkoot Creek Restoration at Stinson Beach- Environmental Assessment U.S. Dept of the Interior National Park Service; Golden Gate National Recreation Area.

8) California Department of Fish and Game Streambed Alteration Agreement for Sediment Removal in Easkoot Creek (October 2006)

9) Conversation with Jeremy Sarrow, Department of Fish and Game biologist. August 22, 2007

10) National Marine Fisheries Service Protected Resources- Marin County database.



Flood Control Zone 5
Creek Sediment Removal Sites

N

Marin County Flood Control and Water Conservation District
County of Marin
Date: May 2007

Scale 1:4,000

0 100 200 400 600 800 1000 Feet

433897

NOTICE OF DETERMINATION

Marin County Environmental Coordination and Review

FILED
MAR 05 2013
RICHARD N. BENSON
MARIN COUNTY CLERK
BY: J. Whitney, Deputy

TO: ☒ Office of Planning and Research
☒ County Clerk, County of Marin

FROM: Marin County Flood Control and Water Conservation District

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title: EASKOOT CREEK SEDIMENT REMOVAL

State Clearinghouse #: #2007-092065
(if submitted to State Clearinghouse)

Contact Person: **Kallie Kull** **Telephone Number: (415) 473-6532**
Assessor's Parcel: **N/A** **Application: Sediment Removal**
Project Location: **Marin County**

Project Description:
In this addendum, the original 2007 Project description has been modified to include the following activities:

1) Construction of an additional sediment removal site (#2) within the floodprone plain of the Easkoot Creek and annual sediment removal from this site. Site #2 is located on National Park property directly adjacent to the Stinson Beach parking lot and behind the Parkside Café;

2) Annual sediment removal at all established sediment removal sites on an as needed basis;

3) Dewatering of the Easkoot Creek channel when necessary for sediment removal including fish relocation as needed, to avoid impacts to native salmonid populations;

4) Low-impact vegetation maintenance for flood control purposes in sections of the Easkoot mainstem that are maintained as flood control easements or where the Flood Control District has a landowner access agreement in place with private property owners.

This is to advise that the Department of Public Works approved the above described project on May 17, 2012, and has made the following determinations regarding the above described project:

1. The approval is within the scope of a project which was previously approved (October 19, 2007),
2. The Initial Study approved on October 22, 2007 for the previous project approval adequately describes the current approval for the purposes of CEQA,

N-13-05

NCE-13-99

POSTED 3/5/13 TO 4/4/13

/forms/nod.doc

3. Pursuant to Section 15164(e) of the CEQA Guidelines, there is no need to prepare a subsequent or supplemental Initial Study/Negative Declaration , and
4. Findings were made pursuant to the provisions of CEQA.

I certify that a copy of the 2007 Negative Declaraion for the Easkoot Creek Sediment Removal, and record of current project approval is on file and may be examined at:

Agency: Marin County Department of Public Works
Address: 3501 Civic Center Drive, #304
San Rafael, CA 94903

_____ Date: 2/28/13
Robert Beaumont; Marin County Flood Control
and Water Conservation District

_____ Date: 3/4/13
Rachel Warner, Environmental Planning Manager

The filing of this Notice of Determination starts a 30 day statute of limitations on court challenges to the approval under CEQA.

MARIN COUNTY COMMUNITY DEVELOPMENT AGENCY
PLANNING DIVISION

ADDENDUM TO NEGATIVE DECLARATION OF ENVIRONMENTAL IMPACT
EASKOOT CREEK SEDIMENT REMOVAL

I. BACKGROUND

A.	Project Sponsor's Name and Address:	Marin County Flood Control and Water Conservation 3501 Civic Center Dr., Room 304 San Rafael, CA 94903
B.	Lead Agency Name and Address:	Marin County Flood Control and Water Conservation District 3501 Civic Center Dr., Room 304 San Rafael, CA 94903
C.	Contact Person and Phone Number:	Kallie Kull, Senior Planner, (415) 473-6532

II. PROJECT DESCRIPTION

A.	Project Title:	Easkoot Creek Sediment Removal
B.	Type of Application(s):	Flood Control Routine Maintenance
C.	Project Location:	Easkoot Creek mainstem channel and bridge crossings over Easkoot Creek on Arenal Ave., Calle del Pinos. Calle del Pradero, Calle del Sierra, Calle del Onda, and Calle del Arroyo, within the Town of Stinson Beach.
D.	General Plan Designation:	The Project site is located within the mapped Coastal Recreation Corridor of the Marin Countywide Plan (CWP) and has a land use designation of C-SF3 (Coastal, Single Family, one unit per one acre to five acres). The CWP Environmental Quality Element designates the Stinson Beach area as an important Environmental Corridor and Resource Conservation Area.
E.	Zoning:	C-MF2 1-4 units per acre
F.	Description of Project:	

Previous Entitlement

A previously adopted Negative Declaration was prepared for the Easkoot Creek Sediment Removal Project, which was approved on October 22, 2007. The Project entailed the Marin County Flood Control District's (*District*) removal of sediment from the Easkoot Creek channel immediately upstream and downstream of six bridge crossings in the Stinson Beach Community at the following locations: 1) Arenal Ave.,2) Calle del Pinos. 3) Calle del Pradero, 4) Calle del Sierra, 5) Calle del Onda, and 6) Calle del Arroyo. The purpose of the 2007 Project was to increase channel capacity and reduce the risk of flooding in the Stinson Beach neighborhood adjacent to the Easkoot Creek channel. The approved project area was limited to no greater than 400 square feet at each crossing, extending no more than 20 feet up or downstream from each of the bridge crossings and the amount of material removed was limited to no more than 20 cubic yards of material to be removed per crossing. The District proposed to conduct sediment removal activities for one year and then monitor the results and confer with the California Department of Fish and Game (DFG) on overall project design and implementation. In 2007 the Project was implemented and monitored and since then alternatives have been studied to

improve the effectiveness of flood control activities while minimizing impacts to Easkoot Creek. The two feasible alternatives considered by the District included:

Alternative 1; High flow by-pass channel. The District initiated discussions with the National Park Service (NPS) regarding the possibility of constructing of a high-flow bypass channel across the Stinson Beach public parking lot that would direct a portion of the creek's winter flow into this channel and directly into the ocean during high storm events. The NPS expressed concern regarding the infrastructure and maintenance, and the Department of Fish and Game expressed concerns about impacts to juvenile steelhead that typically spend time in Bolinas Lagoon before maturing and leaving the estuary system for the ocean. Fishery consulting engineers Mike Love and Associates were hired to analyze the impacts of this alternative on the federally and state listed steelhead population of Easkoot Creek. The results of that study are documented in a technical memo to the District which concludes that there would be potential for negative impacts to steelhead under this alternative. A copy of the technical memo is available upon request from the Marin County Flood Control and Water Conservation District.

Alternative 2: Stinson Beach Flood Control Routine Maintenance Activities Program (*preferred alternative*). The preferred alternative which is acceptable to the National Park Service and recommended by the Department of Fish and Game takes a broader approach to the issue of flood control in the Stinson Beach community by creating the Stinson Beach Routine Maintenance Activities (SB RMA) program for flood control (see revised Project Description below). The objective of the Project is to optimize the effectiveness of the District's sediment removal and combine it with vegetation maintenance in Easkoot Creek to reduce the potential risk of flooding in the Stinson Beach Community, while minimizing impacts to the creek and the listed population of steelhead trout.

Proposed Modifications to the Original 2007 Project

In this addendum, the original 2007 Project description has been modified to include the following activities:

1) Construction of an additional sediment removal site (#2) within the floodprone plain of the Easkoot Creek and annual sediment removal from this site. Site #2 is located on National Park property directly adjacent to the Stinson Beach parking lot and behind the Parkside Café;

2) Annual sediment removal on all established sediment removal sites on an as needed basis;

3) Dewatering of the Easkoot Creek channel when necessary for sediment removal including fish relocation as needed, to avoid impacts to native salmonid populations;

4) Low-impact vegetation maintenance for flood control purposes in sections of the Easkoot mainstem that are maintained as flood control easements or where the Flood Control District has a landowner access agreement in place with private property owners.

1) Construction of sediment removal site #2 and annual sediment removal from all sites as needed

The revised Project description includes establishment of an additional sediment removal site within a low gradient reach of Easkoot Creek adjacent to the Stinson Beach public parking lot, where annual sediment can be removed with least impact to surrounding habitat. The site typically goes dry in the summer and is easily accessed by equipment, so impacts to habitat will be minimized. The proposal will construct a more geomorphically stable creek channel through the site at bankfull width with some floodprone width (floodplain) constructed at the mean bankfull height above the thalweg. Building the sediment removal site using bankfull channel dimensions should aid in the geomorphic stability of the proposed design.

The primary objective of constructing sediment removal site #2 is to enable the District to remove a greater amount of sediment from the floodplain of the Easkoot Creek channel at a location that is easy to access and where sediment will

naturally accumulate due to channel morphology. Sediment removal site #2 will be monitored by the District to assess the effectiveness of sediment removal on channel bed elevation and flood flow capacity and will serve as a pilot study to assess the cost-effectiveness of a centralized sediment removal area to improve downstream flood protection of homes and businesses. An objective of establishing this additional site is to potentially decrease the frequency of sediment removal needed at the bridge crossings in the downstream reach of creek. The District expects sediment removal site #2 to be in operation for a minimum of five years, depending on its effectiveness in capturing sediment and the cost-effectiveness of removing sediment from the creek in this location. Constructing sediment site #2 meets a goal of the DFG prior permit approval in 2007, to look for alternatives that reduce the need for sediment removal at the bridge crossings, however sediment will continue to be removed at the bridge crossings on an as-needed basis.

2) **Dewatering and fish relocation**

Prior to construction of sediment removal site #2 and prior to annual sediment removal activity in any of the permitted project areas, the Project manager in coordination with the District biologist will assess whether there is a need to dewater the channel and relocate fish. Typically the creek goes dry in several of the sites in the fall when the Project is to be implemented, however if there is water in the channel that supports fish habitat, the creek will be dewatered and fish will be relocated by a qualified biologist to a reach lower in the channel where there is sufficient habitat for survival (typically downstream of Arroyo Ave.). Dewatering and fish relocation Project design measures and Best Management Practices (BMPs) are included in the program and will be adhered to during Project implementation.

3) **Riparian Enhancement and Vegetation Maintenance**

Riparian enhancement and vegetation maintenance for flood control purposes is performed annually by the Conservation Corps North Bay (CCNB) under direction of the Marin County Flood Control District. Vegetation maintenance is performed only where the County holds a flood control easement or the work is within the County road right-of way. Additional work may be performed in sections of the creek that flow through private properties where the District has a landowner access agreement with the property owner. The goal of riparian enhancement is to establish a canopy cover that will suppress invasive plant growth, maintain cooler stream temperatures, and selectively limb and trim to reduce obstructions to flow in the channel. Occasionally crews may need to remove a downed or dead tree if it poses a hazard to adjacent structures or could pose a flood hazard if it falls into the channel, but in general the District will not remove live trees and will leave large wood in the channel as habitat or reposition wood so as to not have to remove it completely. Removal of trees is conducted in direct consultation with the Department of Fish and Game.

Routine vegetation pruning and removal below the high water mark and in the channel bed occurs from June 15th to October 15th of any given year. Cattail removal occurs from August 31st to October 15th, so that cattails do not reestablish before winter storms. Vegetation management activities are performed by crews using hand tools and do not include ground-disturbing activities. All vegetation maintenance is done without the use of herbicides.

G. Addendum to Negative Declaration:

An Addendum to the Negative Declaration of Environmental Impact (Oct 22, 2007) has been prepared for this Project. All currently proposed Project-related significant, adverse effects have been discussed in the 2007 Negative Declaration and all necessary mitigation measures have been incorporated into the conditions of approval. The Addendum has been prepared in compliance with CEQA Guidelines Section 15164(b) which states that an addendum to an adopted Negative Declaration may be prepared if only minor technical changes or additions are necessary, and there are no substantial changes to the Project or the circumstances under which the Project was undertaken, or significant new information of substantial importance.

The proposed Project would not involve, or result in, substantial changes in the Project or in substantial changes to the circumstances under which the Project was undertaken or significant new information of substantial importance. The proposed change in the Project does not trigger a need for additional environmental review because no new or substantially more severe impacts than those addressed in the previously-adopted 2007 Negative Declaration have been identified. Furthermore, the supplemental information presented does not require additional mitigation or substantial changes to the mitigation measures in the previously adopted 2007 Negative Declaration of Environmental Impact. Therefore, the Addendum to the previously adopted 2007 Negative Declaration is the appropriate method for reviewing the Project for CEQA compliance.

III. CIRCULATION AND REVIEW

A. Responsible Agencies: *(agencies whose approval is required and permits needed)*

- California Department of Fish and Game- 1600 Routine Maintenance Agreement
- US Army Corps of Engineers- 404 Permit
- Regional Water Quality Control Board SF Bay Watershed- 401 Water Quality Certification
- National Park Service; GGNRA- Special Use Permit
- County of Marin Community Development Agency- Coastal Development Permit

ADDITIONAL DOCUMENTS INCORPORATED BY REFERENCE

1. Marin Countywide Plan, Marin County Community Development Agency, Planning Division (2007).
2. Marin County Code; Supp. No. 6-11, Update 1; (June 7, 2011).
3. A Programmatic Approach to Routine Flood Control Maintenance Activities in Flood Control Zone 5 – Stinson Beach Marin County, California; Marin County Flood Control and Water Conservation District (2012).
4. A Programmatic Approach to Routine Flood Control Maintenance Activities in East Marin County; Marin County Flood Control and Water Conservation District (October 2011).
5. Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Flood Control and Water Conservation District. (July 2011).
6. Review of Background Information and Flood Control Alternatives for Easkoot Creek, Stinson Beach CA. Technical Memo; Mike Love and Associates; (July 2009).
7. Technical Memo from Roger Leventhal, P.E.; Design Basis for Proposed Easkoot Creek Geomorphic Channel and Floodplain Sediment Removal Area #2, Stinson Beach, Marin County, CA (Dec 2012).
8. O'Connor Environmental Inc., DRAFT Easkoot Creek Hydrology & Hydraulics Study Task 3b-Sediment Transport Evaluation.

IV. EVALUATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to Section 15063 of the State CEQA Guidelines, and the County EIR Guidelines, Marin County will prepare an Initial Study for all projects not categorically exempt from the requirements of CEQA. The Initial Study evaluation is a preliminary analysis of a project which provides the County with information to use as the basis for deciding whether to prepare an Environmental Impact Report (EIR) or Negative Declaration. The points enumerated below describe the primary procedural

steps undertaken by the County in completing an Initial Study checklist evaluation and, in particular, the manner in which significant environmental effects of the project are made and recorded.

A. The determination of significant environmental effect is to be based on substantial evidence contained in the administrative record and the County's environmental database consisting of factual information regarding environmental resources and environmental goals and policies relevant to Marin County. As a procedural device for reducing the size of the Initial Study document, relevant information sources cited and discussed in topical sections of the checklist evaluation are incorporated by reference into the checklist (e.g. general plans, zoning ordinances). Each of these information sources has been assigned a number which is shown in parenthesis following each topical question and which corresponds to a number on the data base source list provided herein as Attachment 1. See the sample question below. Other sources used or individuals contacted may also be cited in the discussion of topical issues where appropriate.

B. In general, a Negative Declaration shall be prepared for a project subject to CEQA when either the Initial Study demonstrates that there is no substantial evidence that the project may have one or more significant effects on the environment. A Negative Declaration shall also be prepared if the Initial Study identifies potentially significant effects, but revisions to the project made by or agreed to by the applicant prior to release of the Negative Declaration for public review would avoid or reduce such effects to a level of less than significance, and there is no substantial evidence before the Lead County Department that the project as revised will have a significant effect on the environment. A signature block is provided in Section VII of this Initial Study to verify that the project sponsor has agreed to incorporate mitigation measures into the project in conformance with this requirement.

C. All answers to the topical questions must take into account the whole of the action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts. Significant unavoidable cumulative impacts shall be identified in Section VI of this Initial Study (Mandatory Findings of Significance).

D. A brief explanation shall be given for all answers except "Not Applicable" answers that are adequately supported by the information sources the Lead County Department cites in the parenthesis following each question. A "Not Applicable" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "Not Applicable" answer shall be discussed where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

E. "Less-than-significant Impact" is appropriate if an effect is found to be less-than-significant based on the project as proposed and without the incorporation of mitigation measures recommended in the Initial Study.

F. "Potentially Significant Unless Mitigated" applies where the incorporation of recommended mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less-than-significant Impact." The Lead County Department must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from Section V, "Earlier Analyses", may be cross-referenced).

H. "Significant Impact" is appropriate if an effect is significant or potentially significant, or if the Lead County Department lacks information to make a finding that the effect is less-than-significant. If there are one or more effects which have been determined to be significant and unavoidable, an EIR shall be required for the project.

I. The answers in this checklist have also considered the current California Environmental Quality Act Guidelines and the Initial Study Checklist contained in those Guidelines.

V. ISSUES

1. LAND USE AND PLANNING. *Would the proposal:*

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Conflict with applicable Countywide Plan designation or zoning standards? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The determinations of policy consistency as discussed in this Initial Study section represent County staff interpretation of policies. However, this Initial Study does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

Section 15358(b) of the CEQA Guidelines states that "effects analyzed under CEQA must be related to a physical change in the environment", however policy inconsistencies may not necessarily indicate significant environmental effects Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environment are considered significant impacts pursuant to CEQA. Where potentially significant environmental impacts are raised in the discussion below, they have been mitigated to a less-than-significant impact and, therefore, Project activities are determined to be consistent with the relevant policies cited. Mitigations are addressed further in the topical impact sections following the plan, policies and regulations analyses.

LOCAL PLANS, POLICIES, AND REGULATIONS

Land use designations and development of the Project sites are governed by the objectives and policies of the 2007 Marin Countywide Plan (CWP), sections of the Marin County Code, including Title 22 (Zoning) and Title 23 (Natural Resources) and Title 24 (Development Standards).

MARIN COUNTY CODE

TITLE 22- DEVELOPMENT CODE; Chapter 22.27- Native Tree Protection and Preservation

Section 22.27.040 (k) - Exemption to the Prohibition of Removal of a Protected Tree states that the Project proponent must demonstrate that the tree removal is by a public agency to provide for the routine management and maintenance of public land.

Consistent- The Project is consistent with the Marin County Code (Title 22) which requires projects to minimize tree removal and grading, as well as to maintain adequate site features that establish the visual character of the site. Marin County Flood Control District will minimize any riparian tree removal unless absolutely necessary to achieve the goals of the program, which are to protect the public and public facilities from flooding, while protecting water quality and sensitive habitats. To protect sites that are environmentally sensitive, the District will employ a suite of standard Project design measures and Best Management Practices to protect existing habitats and species of concern. Therefore, the Project is consistent with the development standards set forth in Title 22.

TITLE 23- NATURAL RESOURCES;

The provisions of Title 23 are enacted to protect and promote the public health, safety and general welfare, to preserve environmental qualities, and to protect the value, worth and enjoyment of the use of real property to the fullest extent possible, through the regulation of the uses or activities of the property in a manner which will prevent serious public injury.

Chapter 23.08 Excavating, Grading, and Filling
Chapter 23.08 establishes regulations for excavation, grading and filling in order to:

(1) Preserve and enhance the natural beauties of the land, streams, bays and shorelines;
(2) Reduce or eliminate the hazards of earth slides, mudflows, rock falls, undue settlement, erosion, siltation, sedimentation and flooding;
(3) Protect and enhance the water quality of watercourses, water bodies and wetlands and vegetation for wildlife habitat;
(4) Regulate de facto development caused by uncontrolled grading.

Activities of this nature which are considered exempt from the provisions of this chapter include: (a) Grading done by or on behalf of a public agency that assumes full responsibility for the work.

Consistent: The Project as described will be implemented by the County of Marin Flood Control District or private contractors under contract with the District. The District is a public agency and assumes full responsibility for the work conducted under this Project, therefore the Project is exempt from the terms of Chapter 23.08, and consistent with the requirements of this section of County code.

Chapter 23.09 Floodplain Management
It is the purpose of Chapter 23.09 to promote the public health, safety and general welfare and to minimize the losses described in this section by provisions designed to:

(A) Protect human life and health;
(B) Minimize expenditure of public money for flood control projects;
(C) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
(D) Minimize prolonged business interruptions;
(E) Minimize damage to public facilities and utilities, such as water located in areas of special flood hazard;
(F) Help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
(G) Ensure that potential buyers are notified that property is in an area of special flood hazard; and
(H) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

In order to accomplish its purposes, Chapter 23.09 includes methods and provisions for:

(A) Restricting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
(B) Requiring that uses vulnerable to flood, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
(C) Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
(D) Controlling filling, grading, dredging and other development which may increase flood damage; and
(E) Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Consistent- The Project is consistent with the Marin County Code Title 23 which was enacted to protect and promote the public health, safety and general welfare, and to preserve environmental qualities in a manner which would prevent serious public injury. The objective of the Project is to promote flood control and minimize risk to public health, safety and welfare. The program as designed will minimize potential impacts to sensitive habitats and will be designed to blend into the surrounding natural environment to the greatest extent feasible. The proposed flood control Project incorporates practices which enhance the biological and visual character of the creek corridor. Although some trimming of riparian

trees will occur to prevent flooding, the Project will not alter the riparian character of the Project sites and in many instances will improve the riparian corridor by removing non-native invasive plants. The implementation of the proposed program will respect the surrounding natural environment and return channel elevations to their previous condition prior to sedimentation. Therefore, the proposed Project is maintenance in nature, and will not change the Land Use Designations at the Project sites or conflict with zoning standards or the objectives of the above-mentioned code in any way; therefore, the Project will be consistent with applicable Marin County Code.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Conflict with applicable environmental plans or policies adopted by Marin County? (source #(s): 1, 3, 5)	[ ]	[X]	[ ]	[ ]

CONSISTENCY OF PROJECT WITH MARIN COUNTYWIDE PLAN (2007)

(1) Include Resource Preservation in Environmental Review

BIO-2.1 Include Resource Preservation in Environmental Review *to assess the impact of proposed development on native species and habitat diversity, particularly special-status species, sensitive natural communities, wetlands, and important wildlife nursery areas and movement corridors. Require adequate mitigation measures for ensuring the protection of any sensitive resources and achieving "no net loss" of sensitive habitat acreage, values, and functions.*
Consistent: The Marin County Flood Control District developed a biological assessment for the RMA program which evaluated potential impacts to native species, habitat diversity and special-status species and natural communities (Biological Assessment for Routine Flood Control Maintenance Activities; July 2011). The objective of the biological assessment was to identify adequate measures to protect any sensitive resources and achieve "no net loss" of sensitive habitat acreage, values, and functions. Prescriptions contained in the Biological Assessment include species related Project design measures as well as Special Conditions and Best Management Practices to be employed during Project implementation. The Project is guided by these prescriptions from the Biological Assessment so therefore, the Project will be consistent with Policy BIO-2.1.

(2) Coordinate with Trustee Agencies and Promote Early Consultation with Other Agencies

BIO-2.8 Coordinate with Trustee Agencies*. Consult with trustee agencies (the California Department of Fish and Game, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration (NOAA) Fisheries, U.S. Army Corps of Engineers, Environmental Protection Agency, Regional Water Quality Control Board, and Bay Conservation and Development Commission) during environmental review when special-status species, sensitive natural communities, or wetlands may be adversely affected.*

BIO-2.9 Promote Early Consultation with Other Agencies*. Require applicants to consult with all agencies with review authority for projects in areas supporting wetlands and special-status species at the outset of project planning.*

Consistent*:* The District has coordinated the development and review of this Project and its associated environmental documents with natural resource trustee agencies that require permits for the proposed work. Permitting agencies include the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), the California Department of Fish and Game, the US Army Corps of Engineers and the National Park Service.

(3) Protection of Riparian Systems

BIO-1.5 Promote Use of Native Plant Species*. Encourage use of a variety of native or compatible non-native, non-invasive plant species indigenous to the site vicinity as part of project landscaping to improve wildlife habitat values.*

BIO-1.7 Remove Invasive Exotic Plants. *Require the removal of invasive exotic species, to the extent feasible, when considering applicable measures in discretionary permit approvals for development projects unrelated to agriculture, and include monitoring to prevent re-establishment in managed areas.*

BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials. *Encourage the use of integrated pest management and organic practices to manage pest with the least possible hazard to the environment. Restrict the use of insecticide, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared; the habitat itself is threatened; a substantial risk to public health and safety exists, including maintenance for flood control; or such use is authorized pursuant to a permit issues by the agricultural commissioner. Encourage non-toxic strategies for pest control, such as habitat management using physical and biological control, as an alternative to chemical treatment, and allow use of toxic substances only after approaches have been tried and determines unsuccessful. Continue to implement the Integrated Pest Management ordinance for county-related operations.*

BIO- 4.6 Control Exotic Vegetation. *Remove and replace invasive exotic plants with native plants as part of stream restoration projects and as a condition of site-specific development approval in than SCA and include monitoring to prevent reestablishment.*

BIO-4.7 Protect Riparian Vegetation*. Retain riparian vegetation for stabilization of stream banks and floodplains, moderating water temperatures, trapping and filtering sediments and other water pollutants, providing wildlife habitat, and aesthetic reasons.*

Consistent: Vegetation management activities are employed to achieve the goals of restoring creek habitat and maintaining channel function. Maintaining channel function is achieved by limbing and trimming, cattail cutting, removing vegetation from channel bottoms, and clearing trash. These activities occur from the channel bottom to the top of the high water mark, and include trimming tree limbs from trees and shrubs growing in the channel and trimming branches that hang down into the active channel. These activities employ vegetation control methods such as cutting and removing vegetation above the ground by hand or with loppers, hand saws, chainsaws, pole saws, weed eaters and other hand tools. Bladed weed-eaters are used to cut cattails. Herbicides and pesticides are never used. Tree removal is a rare event. Program BIO-4f of the Countywide Plan recognizes that tree growth may be cleared from the stream channel where removal is essential to protect against property damage or prevent safety hazards. Tree health and hazard potential will be determined by appropriate environmental staff (arborist or biologist). Snags shall be left in place to provide habitat for birds and small mammals if they do not otherwise pose a flood or safety hazard. Staff will consult with CDFG whenever possible if tree removal is necessary, and retention of large wood debris in the creeks will follow CDFG protocols.

(4) Protection of Stream Conservation Areas

BIO-4.1 Restrict Land Use in Stream Conservation Areas. *A Stream Conservation Area (SCA) is established to protect the active channel, water quality and flood control functions, and associated fish and wildlife habitat values along streams. Development shall be set back to protect the stream and provide an upland buffer, which is important to protect significant resources that may be present and provide a transitional protection zone. Best management practices shall be adhered to in all designated SCAs. Best management practices are also strongly encouraged in ephemeral streams not defined as SCAs. Allowable uses in SCAs in any corridor consist of the following, provided they conform to zoning and all relevant criteria and standards for SCAs, as follows:*

- Existing permitted or legal nonconforming structures or improvements, their repair, and their retrofit within the existing footprint;
- Projects to improve fish and wildlife habitat;
- Driveway, road and utility crossings, if no other location is feasible;
- Water monitoring installations;
- Passive recreation that does not significantly disturb native species;
- Necessary water supply and flood control projects that minimize impacts to stream function and to fish and wildlife habitat;
- Agricultural uses that do not result in any of the following:

a. The removal of woody riparian vegetation;
b. The installation of fencing within the SCA that prevents wildlife access to the riparian habitat within the SCA;
c. Animal confinement within the SCA; and
d. A substantial increase in sedimentation.

BIO-4.4 Promote Natural Stream Channel Function. *Retain and, where possible, restore the hydraulic capacity and natural functions of stream channels in SCAs. Discourage alteration of the bed or banks of the stream, including filling, grading, excavating, and installation of storm drains and culverts. When feasible replace impervious surfaces with pervious surfaces. Protect and enhance fish habitat, including through retention of large woody debris, except in cases where removal is essential to protect against property damage or prevent safety hazards. In no case shall alterations that create barriers to fish migration be allowed on streams mapped as historically supporting salmonids. Alteration of natural channels within SCAs for flood control shall be designed and constructed in a manner that retains and protects the riparian vegetation, allows for sufficient capacity and natural channel migration, and allows for reestablishment of woody trees and shrubs without compromising the flood flow capacity where avoidance of existing riparian vegetation is not possible.*

BIO- 4.5 Restore and Stabilize Stream Channels. *Pursue stream restoration and appropriate channel redesign where sufficient right-of-way exists that includes the following: a hydraulic design, a channel plan form, a composite channel cross-section that incorporates low flow and bankfull channels, removal and control of invasive exotic plant species, and bio-technical bank stabilization methods to promote quick reestablishment of riparian trees and other native vegetation.*

BIO-4.10 Promote Interagency Cooperation. *Work in close cooperation with flood control districts, water districts, and wildlife agencies in the design and choice of materials for construction and alterations within SCAs.*

Consistent: Easkoot Creek is subject to protection under the Stream Conservation Area protection policies as set forth in the Countywide Plan. The proposed Project is a flood control project that will maintain functioning channels for conveyance of stream flow, minimize impacts to fish and wildlife habitat, and reduce risk of flooding. Thus, it is a permitted activity within the SCA, as set forth in the Countywide Plan Policy BIO-4.1 Excavation of accumulated sediment and selective vegetation removal within the creek will work to restore the hydraulic and natural functions of the creek and reduce the risk of flooding, thus the Project is consistent with Polices BIO-4.4 and 4.5. The Project promotes interagency cooperation in that it will be implemented by the Marin County Flood Control District on National Park Service lands. Permits for the Project will be issued by the trustee agencies including the Department of Fish and Game, the US Army Corps of Engineers, the Regional Water Quality Control Board and the National Park Service.

5) Species and Habitat Preservation

BIO-1.1 Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors. *Protect sensitive biological resources, wetlands, migratory species of the Pacific Flyway, and wildlife movement corridors through careful environmental review of proposed development applications, including consideration of cumulative impacts, participation in comprehensive habitat management programs with other local and resource agencies, and continue acquisition and management of open space lands that provide for permanent protection of important natural habitats.*

BIO-1.3 Protect Woodlands, Forests, and Tree Resources. *Protect large native trees, trees with historical importance; oak woodlands; healthy and safe eucalyptus groves that support colonies of monarch butterflies, colonial nesting birds, or known raptor sites; and forest habitats. Prevent the untimely removal of trees through the implementation of standards in the Development Code and Native Tree Preservation and Protection Ordinance. Encourage other local agencies to adopt tree preservation ordinances to protect native trees and woodlands, regardless of whether they are located in urban or undeveloped areas*

BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season. *Limit construction and other sources of potential disturbance in sensitive riparian corridors, wetlands, and baylands to protect bird nesting activities. Disturbance should generally be set back from sensitive habitat during the nesting season from March 1 through August 1*

to protect bird nesting, rearing, and fledging activities. Pre-construction surveys should be conducted by a qualified professional where development is proposed in sensitive habitat areas during the nesting season, and appropriate restrictions should be defined to protect nests in active use and ensure that any young have fledged before construction proceeds.

BIO-5.5 Protect Freshwater Habitats. *Preserve and where possible expand habitats associated with freshwater streams, seasonal wetlands, and small former marshes to facilitate the circulation, distribution, and flow of fresh water, and to enhance associated habitat values.*

Consistent: A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the Project's potential impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Project design measures to be employed at each Project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

An Environmental Compliance Coordinator (ECC) under the direction of the Flood Control District will work with the Project on a daily basis to ensure that all Project design measures and BMPs are implemented as prescribed in the field, depending on the location and nature of the activity. The ECC will be on-site to monitor the outcome of all conservation measures to assure protection of all fish and wildlife species and their habitats.

As prescribed in the Biological Assessment, pre-construction surveys for special-status animal and plant species will be completed at individual sites as necessary depending on work windows and seasonal conditions. If surveys confirm species occurrence at a project site, a biologist will oversee all construction work and implement appropriate conservation measures to protect these species. If necessary, avoidance of work areas and stop work orders will be employed if impacts to sensitive species and their habitat cannot be mitigated to a less-then-significant level or avoided completely. As discussed in detail in Sections V. 7. (a, b, c), the proposed Project, will adhere to the mitigation measures outlined in those sections, ensuring that the Project would have less-than-significant impacts on all special-status species, wildlife and habitat diversity. Therefore, the Project has been mitigated to consistency with Policies BIO-1.1, BIO-1.3, BIO-2.4, BIO-2.5, BIO-2.7.

(6) Protection of Watersheds and Water Quality

WR-1.1. Protect Watersheds and Aquifer Recharge. *Give high priority to the protection of watersheds, aquifer-recharge areas, and natural drainage systems in any consideration of land use.*

WR-2.3. Avoid Erosion and Sedimentation. *Minimize soil erosion and discharge of sediments into surface runoff, drainage systems, and water bodies. Continue to require grading plans that address avoidance of soil erosion and on-site sediment retention. Require developments to include on-site facilities for the retention of sediments, and, if necessary, require continued monitoring and maintenance of these facilities upon project completion.*

Consistent: Continued implementation of this Project will help to restore the normal drainage pattern within the Project area by removing accumulated sediment from the creek. There will be a temporary increase in turbidity in these drainages as channel substrate is disturbed from the sediment removal process. These impacts will be short-term and localized. The District will use Best Management Practices (BMPs) outlined in the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance. These BMPs include minimizing loss of native vegetation, conducting the work from the road whenever possible, timing the work prior to the rainy season, minimizing sediment disturbance and suspension within the water, taking all excavated material to an upland disposal site, and sediment/erosion controls to keep excess soil from washing or blowing away during removal, transport and storage (including sediment traps, silt fences, coir logs and wattles containing weed-free rice straw, as necessary). Dewatering will be conducted in a manner to reduce turbidity downstream of the Project area. As discussed in detail in Section V. 4. (c), the proposed Project will adhere to the

mitigation measures outlined in those sections, ensuring that the Project would have less-than-significant impacts on water quality and watersheds. Therefore, the Project has been mitigated to consistency with Policies WR-1.1, 2.3 and 2.4.

(7) Avoidance of Environmental Hazards

EH-3.2. Retain Natural Conditions. *Ensure that flow capacity is maintained in stream channels and floodplains, and achieve flood control using biotechnical techniques instead of storm drains, culverts, riprap, and other forms of structural stabilization.*

Consistent: The Project will restore the channel function of the Easkoot Creek drainage by removing obstructing vegetation and accumulated sediment, which should reduce the potential for flooding of adjacent roadways and promote public safety of people and property from the risks associated with flooding.

(8) Protection of Air Quality

AIR-2.0. Protection from Emissions. *Minimize the potential impacts from land uses that may emit pollution and/or odors on residential and other land uses sensitive to such emissions in unincorporated Marin County.*

AIR-5.0 Adaptation to Climate Change- Adopt policies and programs that promote resilient human and natural systems in order to ease the impacts of climate change.

Consistent: The effects on air quality are from exhaust coming from heavy equipment during sediment removal. These impacts are short-term and temporal, occurring incrementally over 1-7 day work periods, therefore the Project would contribute minimally to air impacts; no significant negative impacts related to air quality are identified. The removal of sediment from this low lying coastal stream will contribute positively to the Community of Stinson Beach's ability to be more resilient as it deals with potential flooding related to rising sea level, more severe weather patterns and increased storm water run-off related to climate change.

(9) Protection of Visual Resources

DES-4.1. Preserve Visual Quality *Protect scenic quality and views of the natural environment – including ridgelines and upland greenbelts, hillsides, water, and trees – from adverse impacts related to development.*

Consistent: The visual resources of the Project sites would not be adversely impacted by maintenance activities because the overall Project is designed to respect the surrounding natural environment and return it to its previous condition (i.e., by removing aggraded sediment, dead and fallen trees and non-native vegetation). Some trimming of riparian trees will occur, but the Project would not result in visual impacts to public or scenic views and vistas from adjacent roadways, therefore, the Project will be consistent with Policy DES-4.1.

(10) Avoid Impacts to Historical Resources

HAR-1.3. Avoid Impacts to Historical Resources. Ensure that human activity avoids damaging cultural resources.

Consistent: As discussed in Sections V. 14. (a, b), the proposed Project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and all sites have previously been dredged multiple times over the past decades in the same locations. Should any cultural resources be discovered during sediment removal activities, all work shall immediately be stopped and the services of a qualified archaeologist from Sonoma State University's Cultural Resources Department shall be engaged to assess the value of the resource and to develop appropriate mitigation measures. As discussed in detail in Sections V. 14. (a), the proposed Project will adhere to the mitigation measures outlined in that section, ensuring that the Project would have less-than-significant impacts on historical resources. Therefore, the Project has been mitigated to consistency with Policy HAR-1.3.

3. **GEOPHYSICAL.** *Would the proposal result in or expose people to potential impacts involving:*

b) Substantial erosion of soils due to wind or water forces and attendant siltation from excavation, grading, or fill? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Grading and excavation within the creek channel will occur in order to construct sediment removal Site #2 and on an annual basis when the access road is used for equipment. If erosion is not controlled there could be a negative impact to water quality from siltation. Implementation of the following Project design measures are incorporated into the Project description and will be implemented as part of the Project design, therefore this will be a less than significant impact.

1) Erosion control Project design measures shall be incorporated into the Project to minimize the discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. Erosion control measures shall be monitored during and after storm events and modifications shall be made, if needed.

2) No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start-up of any phase of the Project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation.

3) To prevent streambed erosion from the use of temporary cofferdams, pipes and pumps used to de-water the creek channel, diversion pipe outlets would be placed on hard surfaces or outfall protection in the form of rock or similar material would be installed. These temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after Project completion and the creeks shall be restored to their natural condition.

4) No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material that may be washed into waters of the State shall be removed from the work area and transported to a legal upland spoils disposal site.

c) Substantial changes in topography from excavation, grading or fill, including but not necessarily limited to: 1) ground surface relief features; 2) geologic substructures or unstable soil conditions; and 3) unique geologic or physical features? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

A long-term objective of this maintenance Project is to restore natural channel formation and to decrease the potential risk and frequency of flooding. A localized change in stream channel morphology at sediment removal site #2 will occur through the establishment of the site and the removal of sediment from all the sites on an annual basis. Given that the channel is currently negatively impacted by aggraded sediment, excavation will be positive in nature. Consequently, the Project will result in less-than-significant impact.

4. **WATER.** *Would the proposal result in*:

a) **Substantial changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?** (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Drainage patterns and rate of surface run-off into Easkoot Creek from the upper watershed and adjacent neighborhood will remain unaltered. The removal of sediment and obstructing vegetation from the channel will increase the channel's ability to carry surface run-off during high flood flows and improve connectivity between downstream and upstream habitats. If the channel has greater functional ability after maintenance has been performed, the potential risk of flooding of adjacent roads and the Stinson Beach Community will be reduced. Consequently, the Project will result in less-than-significant impacts.

b) **Exposure of people or property to water related hazards, including, but not necessarily limited to: 1) flooding; 2) debris deposition; or 3) similar hazards ?** (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

This is a flood control Project which will decrease potential for flood hazards caused by vegetation or sediment deposition and loss of channel capacity, therefore the Project will have an overall beneficial effect on preventing potential flood hazards and debris deposition and consequently the Project will result in less-than-significant impacts.

c) **Discharge of pollutants into surface or ground waters or other alteration of surface or ground water quality (e.g. temperature, dissolved oxygen or turbidity)?** (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Sediment removal activities include prescribed Best Management Practices (BMPs) to be employed during and after Project implementation. Erosion control BMPs are designed to keep soil from leaving the work sites. Potential water quality impacts could have a negative effect upon water quality and aquatic life. The Project design measures described in Section V. 3 (c) will be implemented during the proposed Project and have been incorporated into the Project description to avoid or minimize environmental impacts; therefore this will be a less than significant impact.

d) **Substantial change in the amount of surface water in any water body or ground water either through direct additions or withdrawals, or through intersection of an aquifer by cuts or excavations? (source #(s): 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

1) If there is water in the creek when sediment removal activities are scheduled and the creek needs to be dewatered, there could be temporary impacts to water resources with the potential to adversely affect aquatic resources. The following Project design measures will be implemented during the proposed Project and have been incorporated into the Project description to avoid or minimize environmental impacts; therefore this will be a less than significant impact.

2) The District shall construct the Project in a manner that protects fish and other aquatic resources and avoids loss of their habitat. A biologist shall oversee Project work and implement any necessary conservation measures to protect these species, including pre-construction surveys and rescue and relocation to suitable upstream or downstream habitat.

3) Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic. Intakes and outlets should be designed to minimize turbidity and the potential to wash contaminants into the stream. If a work site is to be temporarily dewatered by pumping, intakes should be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997). A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length. Once the Project work is complete, water should be slowly released back into the work area to prevent erosion and decrease turbidity. The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration. All cofferdams, pumps, pipes, sheet plastic, silt fences or other non-native materials shall be removed from the stream upon Project completion.

4) Sufficient water shall at all times be allowed to pass downstream to maintain aquatic life below the diversion dam.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
e) Substantial changes in the flow of surface or ground waters, including, but not necessarily limited to: 1) currents; 2) rate of flow; or 3) the course or direction of water movements? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

The natural direction and rate of flow of surface waters will remain unchanged. The natural direction of flow of the creek and channel will not change, but the rates of surface flow in some areas may increase with the decreased coefficient of friction resulting from the removal of sediment. As the channel function is increased, there may be a decrease in flood flows coming from the creek and channel onto adjacent roads and properties, which is the objective of the Project. Therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
f) Substantial reduction in the amount of water otherwise available for public water supplies? (source #(s): 3)	[ ]	[ ]	[ ]	[X]

The Project is maintenance in nature and will not reduce the amount of water supply available to the public; therefore, this is not applicable.

6. **TRANSPORTATION/CIRCULATION.** ***Would the proposal result in:***

d) Insufficient parking capacity on-site or off-site? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Construction of sediment removal site #2 and annual sediment removal in this location is scheduled after Labor Day on any given year in order to not impact the National Park Service parking at Stinson Beach. No road closure or additional parking will be required; therefore, this is a less-than-significant impact.

7. **BIOLOGICAL RESOURCES.** ***Would the proposal result in:***

a) Reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats including, but not necessarily limited to: 1) plants; 2) fish; 3) insects; 4) animals; and 5) birds listed as special-status species by State or Federal Resource Agencies? (source #(s): 3, 5, 9)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

In order to assess potential impacts to special status species and their habitats, a Biological Assessment was conducted which looked at potential impacts of routine flood control maintenance activities on special status species and their habitats throughout Marin County, including Easkoot Creek. The following Project design measures will be implemented during the proposed Project and have been incorporated into the Project description to avoid or minimize environmental impacts; therefore this will be a less than significant impact.

1) The District will designate an Environmental Compliance Coordinator (ECC) to oversee the implementation of the Stinson Beach Routine Maintenance Activities Program in the field. Before commencement of any of the maintenance activities, the ECC will review the permit documents for specific information on the type, location and extent of the activity and associated areas of disturbance and determine the Project design measures to implement prior to the maintenance activity. The ECC will distribute the permit documents to the Maintenance Supervisor five days before beginning the maintenance activity and will continue to work with the Project manager to ensure compliance with all permit conditions prior to, during and post-construction.

2) Pre-construction surveys: Prior to construction, County Flood Control biologists will conduct all wildlife and plant pre-construction surveys in a timely manner as specified in the pand included in permits from USFWS, CDFG, ACOE and NOAA.

3) Dewatering and Fish Relocation: Prior to starting work in any location, the Project manager and the ECC will assess whether there is a need to dewater the channel and relocate fish. If standing water is observed in the creek to the extent that it would support fish, then fish are assumed to be present and prior to Project start, the creek will be dewatered and fish exclusionary devices (coffer dam and/or fish exclusionary screening) will be installed both upstream and downstream of the Project to prevent fish re-entering the Project area before completion of work. Fish will be relocated by a qualified biologist to a place lower in the channel where there is sufficient water and habitat for survival (typically downstream of Arroyo Ave.). Water pumped out of the channel during dewatering activities shall be discharged downstream in a manner to not create turbidity in the channel (i.e. discharged onto a vegetated section of bank and allowed to filter back into the channel). Dewatering and fish relocation Project design measures as defined in Section 1- Box 11 below will be adhered to during Project implementation.

4) If flow is intermittent and does not support fish habitat, excavation may occur within the wetted portion of the channel after installing a sediment boom downstream to allow turbid waters to settle out before being released downstream after sediment removal.

5) Any work using equipment located within the stream channel shall be performed in isolation from the flowing stream.

6) If anadromous salmonids are present, a qualified fisheries biologist with appropriate equipment (buckets, aerators, etc.) and qualifications must be on-site to catch and relocate fish downstream as dewatering proceeds.

7) The work area boundaries, including access routes, shall be the clearly marked in the field before any work begins and shall be the minimum size required to complete the Project. Access routes and staging areas shall be chosen such that disturbance or removal of vegetation is minimized.

8) To minimize impacts to the natural channel, mechanized equipment (e.g. excavator, gradall or vactor) shall be placed on top of bank whenever possible. Prior to the use of mechanized equipment in natural channels, the Project manager shall inform the contractor or the Marin County Public Works roads crew supervisor of the site access routes and work staging locations for the equipment to ensure the least disturbance practicable.

9) In the area where vegetation will be removed for construction of Sediment Removal Site #2, erosion control measures, native seeding and native plants indigenous to the area will be installed.

10) If a maintenance activity may cause the introduction of sediments into the stream, no phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to starting any phase of the Project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation.

11) No debris, soil, silt, sand, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area where such material may be washed into waters of the State.

12) Heavy equipment may be placed in the channel to initially construct the sediment removal site, however all annual sediment removal from the sediment trap or at the bridge crossings shall be conducted from the top of bank or access ramp and no heavy equipment will be placed directly in the creek to remove sediment.

13) Activities shall not result in any permanent barriers to upstream or downstream migration of anadromous fish.

14) Generally, vegetation management shall be designed and conducted to meet the objectives of design capacity, channel and basin stability and accessibility while maximizing the shade, erosion control, water quality, and habitat functions of the vegetation.

15) The preferred maintenance approach is to prune lower limbs up to the top of the channel banks, if possible. Multi-stemmed trees are pruned down to a single trunk and lower limbs are removed up to the top of the channel banks, if possible. The goal of this maintenance approach is to develop a native canopy over the channel.

16) Vegetation management does not include the use of dozers, loaders, excavators and other heavy tracked or rubber tired equipment, with the exception of mowing equipment used for fire fuel reduction.

17) Vegetation management includes pruning trees and shrubs to remove lower brushy growth and encourage higher canopy development to provide additional shading that would reduce invasive non-native groundcover growth and promote cooler stream temperatures.

18) Areas where non-native vegetation has been removed shall be re-vegetated with appropriate California native species and protected using appropriate erosion control methods, to the maximum extent practicable. An erosion control seed mix native to the watershed shall be used to control erosion where needed and local plant materials and seeds derived from that watershed shall be used whenever possible.

19) Mulch or tree chips may be used to cover bare soils and if straw is used as mulch it must be seed free straw.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Substantial change in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur at any time throughout the year? (source #(s): *3, 4*)	[ ]	[ ]	[X]	[ ]

V.7(b)-1- The following Project design measures will be implemented during the proposed Project and have been incorporated into the Project description to avoid or minimize environmental impacts; therefore this will be a less than significant impact.

Dewatering and Fish Relocation The creek is typically dry at a number of these sites at the end of the summer however if there is flow in the creek in the any of the areas where the sediment trap will be constructed or sediment is to be removed annually, and the flow is great enough to support fish habitat, the following Project design measures will be implemented to dewater the stream and relocate salmonids:

1) Any work using equipment located within the stream channel shall be performed in isolation from the flowing stream.

2) If standing water is observed in the creek to the extent that it would support fish, then fish are assumed to be present and prior to Project start, the creek will be dewatered and fish exclusionary devices (coffer dam and/or fish exclusionary screening) will be installed both upstream and downstream of the Project to prevent fish re-entering the Project area before completion of work. Dewatering activities will be closely monitored by the Environmental Compliance Coordinator and the Project manager to ensure that the channel outside of the Project area is not inadvertently dewatered through sub-surface flow. If incidental dewatering is observed, the Project will be temporarily halted while the dewatering system is adjusted to ensure that water remains in areas of the channel outside of the Project area that continue to support fish habitat.

3) If flow is intermittent and does not support fish habitat, excavation may occur within the wetted portion of the channel after installing a sediment boom downstream to allow turbid waters to settle out before being released downstream after sediment removal.

4) If anadromous salmonids are present, a qualified fisheries biologist with appropriate equipment (buckets, aerators, etc.) and qualifications must be on-site to capture and relocate fish downstream as dewatering proceeds.

5) Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.

6) Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.

7) If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. If steelhead or coho salmon are present, the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997).

20) A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe shall discharge onto the top of bank into a densely vegetated area, which may require extra hose length.

21) Dewatering activities will be closely monitored by the EEC and the Project manager during all dewatering and sediment removal activities to ensure that the channel outside of the Project area is not inadvertently dewatered through sub-surface flow. If incidental dewatering upstream or downstream of the dewatered area is observed, and there is potential for fish stranding due to drop in water levels outside of the defined Project area, the pumping associated with dewatering will be immediately halted. No work will resume until the EEC and the Project manager have adjusted the dewatering system or Project scope to ensure that no incidental dewatering strands fish outside of the Project area. Adjustments to solve this problem could include discharging the pumped water back up stream to continue watering the upper reach of creek above the Project site, and/or decreasing the depth of sediment removal such that water is not drawn down into the dredging area at such a rate to dewater the channel outside of the Project area. If adjustments to the dewatering system and/or the scope of work cannot be made to safeguard that the channel will not be dewatered outside of the Project area, then the sediment excavation at that site must be halted.

22) Once the Project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.

23) The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under provisions for dewatering shall be removed unless required for erosion control or habitat enhancement and/or restoration.

Salmonids

If salmonids are determined or presumed to be present in the Project site, then the following Project design measures shall be implemented:

1) The Project will take place during late summer at times of lowest water although no work will be conducted before June 15th later than Oct. 15th of any given year unless approved by a Fish and Game biologist. The work window for this Project is established to minimize any potential impact on steelhead that may be present in the Project area.

2) To minimize turbidity and stress to steelhead habitat, personnel will avoid walking through stream pools and thalwegs, and will instead walk across riffles or outside of the stream bed to access a Project site.

3) No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified and permitted biologist.

4) If anadromous salmonids are present, a fisheries biologist with appropriate equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.
5) Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.

6) Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.

7) If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997).

8) A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe shall discharge onto the top of bank into a densely vegetated area, which may require extra hose length.

9) Once the Project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.

10) The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.

11) For minor actions where the creek is intermittent and does not support salmonid habitat, and the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur with dewatering, measures will be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fence or boom across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream following completion of the activity.

Red-Legged Frog

The nearest known breeding location for California red-legged frogs is near Wilkins Gulch, approximately three miles away. Although CRLF have not been observed at the work sites proposed in this Project, there is potential for CRLF to occur there. The following Project design measures will be employed during Project implementation:

1) Pre-construction aquatic surveys should be conducted by a qualified biologist prior to the onset of any disturbance related activities, following the protocol outlined in the Revised Guidelines on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005).

2) If California red-legged frogs, tadpoles, or eggs are found, the appropriate state and federal agencies will be contacted to determine what actions should be taken. No frogs will be handled moved without proper authority.

3) If a maintenance activity site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh no larger than five millimeters to prevent CRLF from entering the pump system.

4) A biological monitor should on site to oversee aspects of the Project that disturbs CRLF habitat, e.g. disturbance of aquatic vegetation.

5) Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of red-legged frogs, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

California clapper rail and California black rail

None of the sites support suitable habitat for California clapper rail or California black rail; however there are CNDDB records for California clapper rail at the mouth of Easkoot Creek at Bolinas Lagoon, 1.25 miles from the nearest site. If work occurs during the non-nesting season between September 1st and January 31st, then avoidance has been achieved and work can proceed. When working within 250 ft of salt or brackish marshland during the period February 1st through August 31st, presence for either rail species shall be assumed and the following Project design measures shall be implemented:

1) Work shall be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active.

2) Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work shall occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the Project sites.

3) Activities shall proceed as quickly as possible to reduce disturbance from noise, dust, etc.

4) Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If removal is necessary, the work shall be scheduled outside of the breeding season (February 1 – August 31st); all vegetation shall be removed by hand, and shall be salvaged and retained for replacement after work is completed.

Raptors and wading birds

The work sites do not support breeding habitat for raptors or wading birds, but these birds could forage or rest in or near the sites. Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them shall be minimized.

1) If work occurs after the nesting season (August 1st – January 31st), then avoidance has been achieved and work can proceed.

2) During nesting season, (February 1st – July 31st), the Environmental Compliance Coordinator shall walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed. If a nest is observed any removal of trees or shrubs or maintenance activities in the vicinity of active bird nests could result in nest abandonment, nest failure or premature fledging. If removal of trees or shrubs occurs, or maintenance begins between February 1st and July 31st (includes nesting season for passerine or non-passerine birds, and raptors), a nesting bird survey shall be performed within 14 days prior to the removal or disturbance of potential nesting trees or shrubs. All trees with active nests shall be flagged and a non-disturbance buffer zone of 50-90 feet shall be established around the nesting tree, or the site shall be avoided until it has been determined that the young have fledged.

Landbirds

The Project sites are along a riparian corridor that potentially supports passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would violate the federal Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game (CDFG) Code.

1) Avoidance will be achieved if maintenance activities are scheduled for August 1st to January 31st to avoid the nesting season (February 1st to July 31st).

2) If removal of trees or shrubs occurs, or maintenance begins between February 1st and July 31st (includes nesting season for passerine or non-passerine birds, and raptors), a nesting bird survey shall be performed within 14 days prior to the removal or disturbance of potential nesting trees or shrubs. All trees with active nests shall be flagged and a non-disturbance buffer zone shall be established around the nesting tree, or the site shall be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft for passerines and non-passerine land birds. Active nests shall be monitored to determine when the young have fledged and are feeding on their own.

3) In addition to surveying trees and shrubs for nesting birds, surveys shall be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the Project site within 14 days prior to the commencement of Project related activities. The Project manager shall also review all staging areas to ensure nesting and special status birds are not present. If an active nest is sited active nests shall be flagged and a non-disturbance buffer zone shall be established around the nesting area, or the site shall be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft. for passerines and non-passerine land birds. Active nests shall be monitored to determine when the young have fledged and are feeding on their own.

Mammals

There are no listed mammal species in the Project quad maps and the mammals on the species of concern list are all bat species. Some of the sediment removal and vegetation maintenance sites may contain suitable habitat for roosting bats. Likely roost sites are under bridges and in trees (in layers of bark, woodpecker holes, and hollow branches). Bat presence can be determined, in part, by visual detection of bat guano in the vicinity of roost areas. The droppings are black and small, about 4 – 8 mm long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software.

1) Tree removal may impact roosting bats; therefore, if tree removal is necessary, a qualified biologist shall conduct a habitat assessment for potentially suitable bat habitat. If the survey reveals no suitable habitat, avoidance has been achieved.

2) If trees that are suitable for bat habitat are to be removed from March 1 through April 15 and/or August 31 through October 15, then avoidance has been achieved, and the trees shall be removed following the two-phased removal system. The two-phased removal system shall be conducted over two consecutive days. The first day, in the afternoon, limbs and branches are removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures would be avoided, and only branches or limbs without those features would be removed. On the second day, the entire tree is removed.

3) If the survey reveals suitable bat habitat, and tree removal is scheduled for outside the work window (from April 16 through August 31 and/or October 16 through February 28), then presence/absence surveys shall be conducted prior to any tree removal. If presence/absence surveys are negative then avoidance has been achieved, and trees may be removed following the two-phased tree removal system. The two-phased removal system shall be conducted over two consecutive days. The first day, in the afternoon, limbs and branches are removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures would be avoided, and only branches or limbs without those features would be removed. On the second day, the entire tree is removed.

4) If presence/absence surveys result in bat occupancy then the occupied trees shall only be removed from March 1 through April 15 and/or August 31 through October 15 following the two-phased tree removal system (see above).

5) Training sessions shall be given to all workers during bat nesting season to inform them of protective measures, instruct them in identification of bats and their habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Monarch Butterfly

The monarch butterfly is not federally or state listed; however, its roosting habitat is often reviewed under CEQA. The Easkoot Creek Project areas are adjacent to known over wintering sites for Monarch butterfly. Proposed activities will not

directly affect the butterflies but could produce noise disturbances and harassment to them. The butterfly overwintering season runs from October through March and typically the proposed maintenance activities will occur before the butterflies migrate to the area. When working during the period April 1st through September 30th, the Project manager shall walk the area of proposed activity each day before maintenance activities begin to determine presence of Monarch butterflies. If none are observed, avoidance can be assumed and work can proceed. If Monarch butterflies are observed at the site, the butterflies must be allowed to leave the site on their own before work commences.

Special Status Plant Species

1) Within the Project area where special status plant species may potentially occur, a qualified biologist shall conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

2) If suitable habitat is determined to be present within the Project area, botanical surveys shall be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, shall be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000).

3) Surveys shall be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

4) If listed species are observed or presumed present, then the District shall take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the Project shall be redesigned to avoid listed plant species.

Riparian Enhancement and Vegetation Maintenance

Vegetation management includes pruning trees and shrubs to remove lower brushy growth and encourage higher canopy development to provide additional shading that would reduce invasive non-native groundcover growth and promote cooler stream temperatures. Vegetation management does not include the use of dozers, loaders, excavators and other heavy tracked or rubber tired equipment.

1) Generally, vegetation management shall be designed and conducted to meet the objectives of design capacity, channel stability and accessibility while maximizing the shade, erosion control, water quality, and habitat functions of the vegetation.

2) The preferred maintenance approach is to prune lower limbs up to the top of the channel banks, if possible. Multi-stemmed trees are pruned down to a single trunk and lower limbs are removed up to the top of the channel banks, if possible. The goal of this maintenance approach is to develop a native canopy over the channel and remove obstructions to flow that could increase the risk of flooding.

3) At Site #2 (sediment trap) an access ramp down into the creek for equipment will be established and used for annual sediment removal activities. The access ramp will be revegetated each year with native grasses once sediment removal is completed and the remaining areas of bank in the vicinity of the trap will be left undisturbed. The loss of vegetation in the access ramp area will be compensated for by plantings within the National Park equal or greater in size than the area impacted by the access ramp.

Invasive Species

1) The District shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.

2) As a precaution against invasive quagga and zebra mussels, if rubber boots or waders are used in maintenance activities, crew will wash and dry them off-site prior to using them in another creek or tributary.

VI. MANDATORY FINDINGS OF SIGNIFICANCE. Pursuant to Section 15065 of the State EIR Guidelines, a Project shall be found to have a significant effect on the environment if any of the following are true: *(Please explain your answer after each question*

		Yes	No	Maybe
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?	[ ]	[X]	[ ]

As described in Section V of this Initial Study, the Project design measures included in the proposed Project will avoid or mitigate any environmental impacts from the proposed Project to a level of insignificance.

		Yes	No	Maybe
b)	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?	[ ]	[X]	[ ]

As described in Section V of this Initial Study, the proposed Project will meet both short-term and long term goals of protecting the environment.

		Yes	No	Maybe
c)	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).	[ ]	[X]	[ ]

As described in Section V of this Initial Study, any potential environmental impacts from the proposed Project would be mitigated to a level of insignificance; therefore there will not be a cumulative impact on the environment.

		Yes	No	Maybe
d)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	[ ]	[X]	[ ]

As described in Section V of this Initial Study, any potential environmental impacts from the proposed Project would be mitigated to a level of insignificance; therefore the Project will not cause substantial adverse effects on human beings, either directly or indirectly.

342164

NOTICE OF DETERMINATION
Marin County Environmental Coordination and Review

FILED
OCT 22 2007
MICHAEL J. SMITH
MARIN COUNTY CLERK
By: J. Whitney, Deputy

TO: ☒ Office of Planning and Research
☒ County Clerk, County of Marin

FROM: Marin County Department of Public Works
(Lead Agency)

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title: Easkoot Creek Sediment Removal at Bridget Crossings
State Clearinghouse # 2007-092065
Contact Person: Kallie Kull, Senior Planner
Assessor's Parcel: N/A **Application: Sediment Removal**

Project Location: The project area is on Easkoot Creek, which runs through the town of Stinson Beach and discharges into the Bolinas Lagoon downstream of Calle del Arroyo. Driving directions; From Highway 101, just north of the Golden Gate bridge in San Francisco, take the Highway 1 north exit towards Mill Valley/Stinson Beach. Stay straight on Highway 1, veering right as needed to the Town of Stinson Beach (approximately 12 miles). Proceed north on Highway One and at the north end of town to find the intersections of the Calles with Highway 1. Turn left on the individual Calles to the bridges and project sites that cross Easkoot Creek.

Project Description: Sediment will be removed from the creek channel immediately upstream and downstream of six bridge crossings of Easkoot Creek with Arenal Ave., Calle del Pinos. Calle del Pradero, Calle del Sierra, Calle del Onda, and Calle del Arroyo. The area to be dredged will be no more than 400 square feet at each crossing, extending no more than 20 feet up or downstream from the bridge crossings and the amount of material removed will be no more than 20 cubic yards per crossing. The project will take place during late summer, no later than Oct. 31, at times of lowest water, so as to minimize any potential impact on salmon and steelhead that may be present in the project area. Should any fish be present on site, a State and/or NMFS certified fisheries biologist will be on-site to block net the creek and relocate the fish upstream. A creek biologist from the County will also be on-site the entire time during the project to ensure that the work is being done according to conditions set forth in the California Fish and Game 1600 Streambed Alteration Agreement conditions. All work will be done from the bank and no equipment will be placed in the creek. All sediment removed from the creek will be transported to a legal upland spoils disposal site.

This is to advise that the Marin County Department of Public Works Director approved the above-described project on October 19, 2007, and has made the following determinations regarding the above described project:

1. The project in its approved form will not have a significant effect on the environment.
2. A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures were not made a condition of the approval of the project.
4. Findings were made pursuant to the provisions of CEQA.

I certify that a copy of the Negative Declaration of Environmental Impact, and record of project approval is on file and may be examined at:
Agency: Marin County Department of Public Works

Address: 3501 Civic Center Drive, Room 304
San Rafael, CA 94903-4112

By: _____
Farhad Mansourian, Director, Department of Public Works

Date: 10/22/07

The filing of this Notice of Determination starts a 30 day statute of limitations on court challenges to the approval under CEQA.

VII. PROJECT SPONSER'S INCORPORATION OF MITIGATION MEASURES:

Acting on behalf of the project sponsor or the authorized agent of the project sponsor, I (undersigned) have reviewed the Initial Study for the Easkoot Creek Sediment Removal, Stinson Beach, CA and have particularly reviewed the mitigation measures and monitoring programs identified herein. I accept the findings of the Initial Study, including the recommended mitigation measures, and hereby agree to modify the proposed project application4s now on file with Marin County to include and incorporate all mitigation measures and monitoring programs set out in this Initial Study.

Farhad Mansourian — 10-22-07

(Project Sponsor's Name or Representative) — Date

(Project Sponsor's Name or Representative) — Date

VII. DETERMINATION: Pursuant to Sections 15081 and 15070 of the State Guidelines, the foregoing Initial Study evaluation, and the entire administrative record for the project:

[X] I find that the proposed project WILL NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

[ ] I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

[ ] I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Signature T Haddad Date 9/13/07

Printed Name Tim Haddad Date September 13, 2007

416402

NOTICE OF DETERMINATION

Marin County Environmental Coordination and Review

FILED
JUN 06 2012
RICHARD N. BENSON
MARIN COUNTY CLERK
BY: J. Whitney, Deputy

TO: ☒ Office of Planning and Research
☒ County Clerk, County of Marin

FROM: Marin County Flood Control and Water Conservation District
(Lead Agency)

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title: Marin County Flood Control Routine Maintenance Activities Program

State Clearinghouse #: 2012022053 *(if submitted to State Clearinghouse)*

Contact Person: Kallie Kull, Senior Planner

Assessor's Parcel: N/A

Application: Routine Flood Control Maintenance Activities

Project Location: East Marin County (Zones 1,3,4,7,9), and County Service Area 13 in Upper Lucas Valley

Project Description: The Marin County Flood Control and Water Conservation District's (MCFCWCD) Routine Maintenance Activities (RMA) program defines the scope and timing of the maintenance activities conducted annually in and around flood control channels and facilities in East Marin County. The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Levee maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program establishes programmatic guidance to conduct these maintenance activities for flood control purposes while avoiding and minimizing environmental impacts.

This is to advise that the Marin County Flood Control and Water Conservation District Director approved the above-described project on February 16, 2012, and has made the following determinations regarding the above described project:

1. The project in its approved form will not have a significant effect on the environment.
2. A Mitigated Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures were made a condition of the approval of the project.
4. Findings were made pursuant to the provisions of CEQA.

I certify that a copy of the Negative Declaration of Environmental Impact and record of project approval is on file and may be examined at:

Agency: Marin County Department of Public Works

Address: 3501 Civic Center Drive, Room 304, San Rafael, CA 94903

POSTED 6/6/12 TO 7/5/12

By: _____ Date: 6/4/12

Robert Beaumont, Director,
Marin County Flood Control and Water Conservation District

The filing of this Notice of Determination starts a 30 day statute of limitations on court challenges to the approval under CEQA.

N-12-06 NLE-12-124

NEGATIVE DECLARATION

Marin County
Environmental Coordination and Review

Pursuant to Section 21000 et. seq. of the Public Resources Code and the Marin County Environmental Impact Review Guidelines and Procedures, a Negative Declaration is hereby granted for the following project.

1. **Project Name:** **Marin County Flood Control Routine Maintenance Activities Program**

2. **Location and Description:** **Eastern Marin County Flood Control Zones 1, 3, 4, 7, 9, and Community Service Area 13 in Upper Lucas Valley**

The Marin County Flood Control and Water Conservation District's (MCFCWCD) Routine Maintenance Activities (RMA) program defines the scope and timing of the maintenance activities conducted annually in and around flood control channels and facilities in East Marin County. The MCFCWCD is responsible for maintenance of 37 miles of stream channels, two sediment basins, and numerous flood control facilities throughout East Marin County (e.g. weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drains and pump station inlet/outlet structures). The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Levee maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program does not include projects requiring individual agency permits, such as larger capital improvement projects (e.g. building a new pump station), large dredging projects (e.g. dredging the mainstem of Novato Creek), or new bank stabilization projects using only hardened materials such as rock rip rap. The RMA program establishes programmatic guidance to conduct these maintenance activities for flood control purposes while avoiding and minimizing environmental impacts. The program provides the organizational framework to ensure that routine maintenance work complies with the terms of State and Federal regulations and permit conditions to protect water quality, wetlands and riparian habitats.

3. **Project Sponsor:** **Marin County Flood Control and Water Conservation District**

4. **Finding:** **Based on the attached Initial Study and without a public hearing, it is my judgment that:**

☐ The project will not have a significant effect on the environment.

☒ The significant effects of the project noted in the Initial Study attached have been mitigated by modifications to the project so that the potential adverse effects are reduced to a point where no significant effects would occur.

Rachel Warner
Marin County Environmental Coordinator

Date: 2/14/12

Based on the attached Initial Study and the comments received during the public review period, the Marin County Department of Public Works grants a Negative Declaration.

Robert Beaumont, Director
Marin County Flood Control and Water Conservation District

Date: 6/4/12

5. Mitigation Measures:

(Select one of the following statements)

☐ The Initial Study did not identify any potential adverse impacts and, therefore, the project does not require mitigation measures.

☒ Please refer to mitigation measures in the attached Initial Study.

☐ The Initial Study concludes that the Department can modify the project's potential adverse impacts, as noted under the following factors in the attached Initial Study.

The Department of Public Works has incorporated into the project all of the mitigation measures described in the attached Initial Study.

6. Preparation:

The Marin County Flood Control and Water Conservation District prepared this Negative Declaration and interested parties may obtain copies at the address listed below.

Kallie Kull, Senior Planner
Marin County Department of Public Works
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Monday through Friday
8:30 a.m. to 4:30 p.m.
Telephone (415) 473-6528

MARIN COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DRAFT INITIAL STUDY

Marin County Flood Control District
Routine Maintenance Activities Program

I. BACKGROUND

A. Project Sponsor's Name and Address: Marin County Flood Control District
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

B. Lead Agency Name and Address: Marin County Flood Control District
3501 Civic Center Drive, Room 304
San Rafael, CA 94913-4186

C. Contact Person and Phone Number: Kallie Kull; Senior Planner, (415) 499-6532

II. PROJECT DESCRIPTION

A. Project Title: Marin County Flood Control District: Routine Maintenance Activities Program (RMA)

B. Type of Application(s): Flood Control Routine Maintenance Projects

C. Project Location: The geographic extent of the RMA program includes routine maintenance activities carried out in and around creeks, channels, ditches, levees, flood control structures and facilities, located within six project areas: one each for five flood control zones in East Marin County (Zones 1,3,4,7,9), and County Service Area 13 in Upper Lucas Valley (See Figure 1):

Flood Control Zone 1 – Novato
Flood Control Zone 3 – Richardson Bay
Flood Control Zone 4 – Bel Aire and Strawberry Circle
Flood Control Zone 7 – Santa Venetia
Flood Control Zone 9 – Ross Valley
County Service Area 13 – Upper Lucas Valley

Refer to:
Figure 1: Map of County Flood Control Zones and CSA/CSD areas included in the project
Attachment A: Maps 1-12 of Project Areas and Species of Concern
Attachment B: Master list of Project Areas and RMA Activities
Attachment C: Master List of all Sediment Removal Sites

D. General Plan Designation: The proposed project area is vast in extent and includes creeks which are located within the mapped City Centered and Coastal Baylands Corridors of East Marin (Countywide Plan 2007) and within Streamside Conservation Areas (SCAs).

E. Zoning: Project areas within the RMA program fall into the land use and zoning categories of Residential, General Commercial/Mixed Use, Office/Commercial Mixed Use, Neighborhood/Commercial Mixed- Use/ Recreational Commercial, Industrial, Agricultural, Public and Open Space Lands.

PROJECT AREA

The Marin County Flood Control District is responsible for maintenance of 37 miles of stream channels, two sediment basins, and numerous flood control facilities (e.g. weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drains and pump station inlet/outlet structures), throughout East Marin County. The geographic extent of the proposed Routine Maintenance Program (RMA) includes six project areas: one each for five flood control zones (Zones 1, 3, 4, 7 and 9), and one project site in County Service Area 13 in Upper Lucas Valley (*Figure 1*). The Flood Control Zones included in this project are located exclusively in Eastern Marin County. Each zone includes a number of project sites, which are differentiated based on stream reaches and habitat types. In all, there are 93 specific sites where the District performs routine maintenance activities. There are 26 project sites located in Flood Control Zone 1 in the Novato Creek watershed, 33 project sites in Flood Control Zone 3 in Mill Valley, six project sites in Flood Control Zone 4 in Bel Aire/Strawberry, 13 project sites in Flood Control 7 in Santa Venetia, 14 project sites in Flood Control Zone 9 in the Corte Madera Creek watershed, and one project site in County Service Area 13 in Upper Lucas Valley.

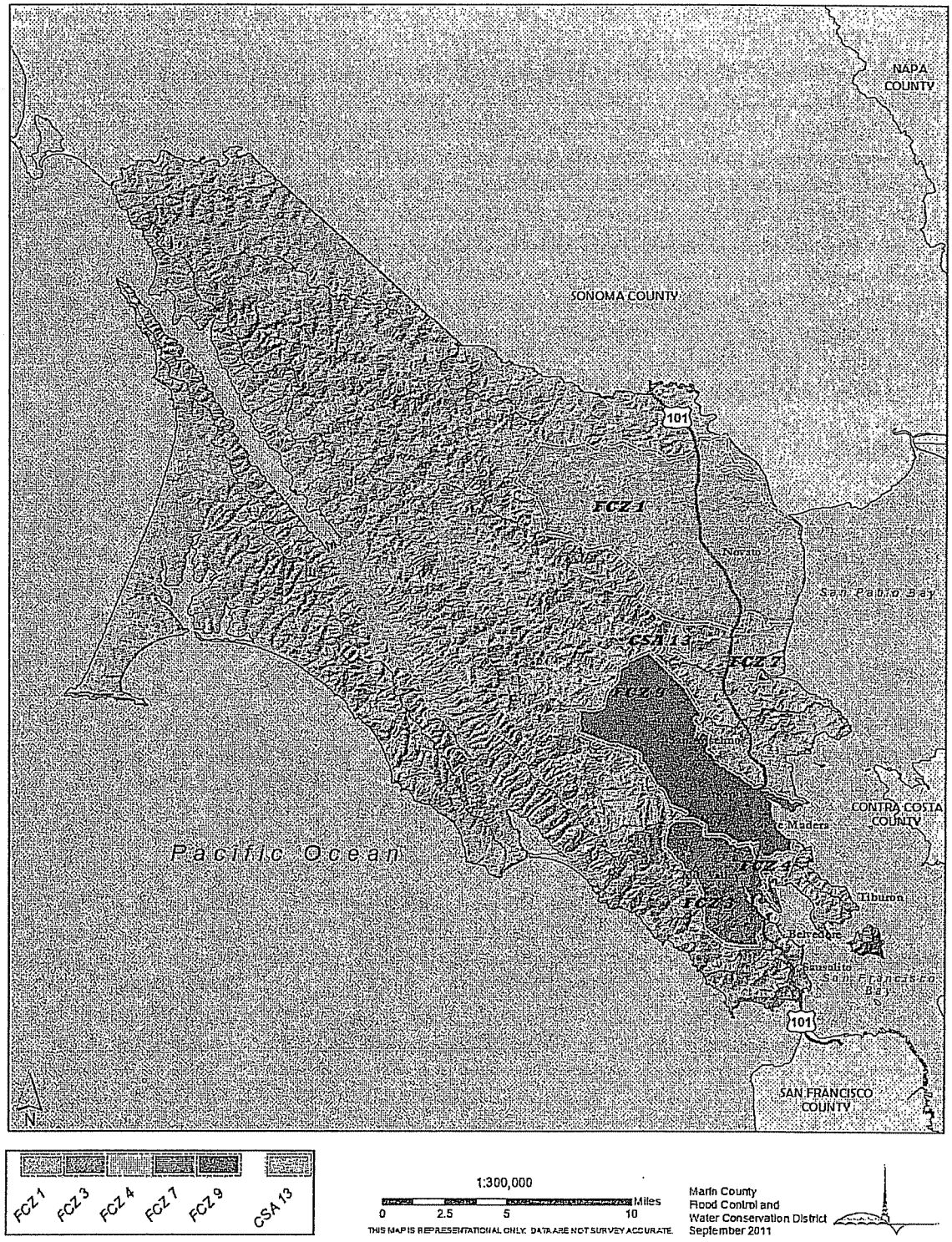


Figure 1. Project areas covered by the Marin County Flood Control District's Routine Maintenance Activities Program; Flood Control Zones 1, 3, 4, 7, 9, and Community Service Area 13 in Upper Lucas Valley, all in East Marin County.

PROGRAM OVERVIEW

Program Purpose

The Marin County Flood Control District's Routine Maintenance Activities Program (RMA) defines the types and scope of the District's annual routine maintenance activities conducted in and around flood control channels and facilities. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program establishes programmatic guidance to conduct these activities for flood control purposes while avoiding and minimizing environmental impacts. The RMA program provides the organizational framework for flood control staff and managers to oversee maintenance crews and their activities and to ensure that their work complies with the terms of State and Federal regulations and permit conditions to protect water quality, wetlands and riparian habitats. The RMA program does not include projects requiring individual agency permits, such as larger capital improvement projects (e.g. building a new pump station), large dredging projects (e.g. dredging the mainstem of Novato Creek), or new bank stabilization projects using only hardened materials such as rock rip rap. The District will implement the RMA program in a yearly work cycle, to include pre-project notification, project implementation, and annual reporting.

Jurisdictional Boundaries

Maintenance activities are implemented on an annual basis only in locations where the Marin County Flood Control District and/or its municipal partners own the land outright in fee title or holds legal easements; with the exception of four sites on private property, where the District annually receives written landowner permission before performing maintenance activities. No aspect of the RMA program shall be implemented in areas where the County or its municipal partners do not have direct legal jurisdiction or landowner permission.

Environmental Setting

Eastern Marin County watersheds share the same general anatomy: the ridge-tops and upper slopes of the watersheds are in generally protected open space areas, the valley floors are densely developed, and the lower reaches are tidally-influenced and quite flat. The District's 93 RMA sites are located mainly in the valley floors and lower creek reaches. The uplands encompass the hilly, often steep, terrain from the top of the ridges down to where the valleys flatten out. They are dominated by mixed evergreen forest and oak-bay woodlands, interspersed with open annual grasslands, chaparral, and coastal scrub. Much of the upland habitats in Marin County are protected as public and municipal open space. The valley floors are developed with dense residential and commercial developments, often right up to, and sometimes in, the creek channels. The road network can also be quite dense, with many bridges spanning the creeks. In almost all cases, creeks are heavily impacted by historic human use, including concrete channelization and straightening, constrained riparian corridors, impacted floodplains, and non-native invasive species. The lower reaches of creeks have very little topographic relief, they are either tidally influenced and support saltwater or brackish-water marsh, or are protected by levees for agricultural or residential use. While often less developed, these lower marsh areas have altered hydrology and are constrained by roads, levees, and other human-induced development. Freshwater seasonal wetlands have become established in areas that were once historical baylands and which have been diked for agriculture. These seasonal wetlands provide habitat for migratory waterfowl and shorebirds, including California clapper and black rails.

›pe of Work

The RMA program covers five categories of routine flood control maintenance activities:

1) Vegetation management
2) Sediment and debris removal
3) Erosion control
4) Maintenance and repair of flood control structures
5) Levee maintenance

1) Vegetation Management Activities are employed to achieve three main goals:

- maintain channel function
- reduce fire fuels,
- restore creek habitat

These goals are achieved by removing invasive non-native plants and re-vegetating with native plants where necessary to control erosion and maintain riparian habitat. Channel maintenance is achieved by limbing and trimming of riparian trees and shrubs, selective cattail cutting and removing trash. Occasionally trees growing on the channel bed need to be removed because they obstruct flow or divert flow and cause bank erosion. This work is typically limited to the removal of arroyo willow or white alder growing in the center of the channel bed.

Vegetation management activities are performed by crews using hand tools and do not include ground-disturbing ivities. Cattails are removed from selected reaches as part of sediment removal activities. All vegetation maintenance is done without the use of herbicides.

Vegetation management takes place from the channel bottom to the top of the high water mark, and includes trimming limbs from trees and shrubs growing over the channel and trimming branches that hang down into the active channel. The goal of vegetation management within natural channels is to establish a canopy cover that will suppress invasive plant growth and maintain cooler stream temperatures.

Fire fuel reduction is achieved by mowing on tops of banks and levees and the thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas.

Tree removal is a rare event with the exception of non-native trees such as acacia. Once or twice a year crews may need to remove a tree that has died and poses a hazard to adjacent structures or could pose a flood hazard if it falls into the channel. Removal of these trees is conducted in consultation with the Department of Fish and Game.

Removal of non-native vegetation takes place as part of maintaining channel function but also occurs in a more strictly restoration-type activity led by Point Reyes Bird Observatory's STRAW Program (Students and Teachers Restoring a Watershed) in partnership with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP). Students working in the STRAW Program remove invasive non-natives and replant sites with native vegetation. The program has worked at creek sites near schools where access and proximity allow for the removal of all traces of the non-native vegetation and the return to sites to continue maintenance and restoration of the creek corridor. These restoration activities have been ongoing for over 10 years. The partnership with the STRAW Program demonstrates the County's efforts to manage creeks through stewardship of the land. Native plant restoration reduces the maintenance needs in e creeks and allows for better habitat to be established in the urban creek corridors. The students, teachers and parents working in their local creeks increases the community awareness of the habitat and supports the County's watershed-based approach to caring for our creeks.

2) Sediment and Debris Removal

Sediment and debris removal from channels, sediment basins and around flood control facilities (e.g. trash racks) is completed on a routine basis in order to maintain channel function and facilitate unobstructed flow around structures including bridges, storm drain outlets, and pump stations. Excavated sediment is hauled away to a permitted spoils disposal site. Debris items found in the channels and around flood control facilities (e.g. tires, shopping carts, trash, furniture), are typically removed by hand and hauled to a certified disposal site, such as a landfill. Attachment B lists all sediment removal sites included in the RMA program with specific information regarding dimensions of work area, equipment used, location of equipment, and expected duration of work at each site.

3) Erosion Control

Erosion control activities take place only where the District and/or its partners hold fee title to the land. Most large erosion control and large bank stabilization projects are not routine and therefore are not included in the RMA program. The only erosion control projects included in the RMA program are those where a failing streambank is composed of earthen materials and biotechnical engineering techniques are used to stabilize the bank and prevent further erosion (e.g. brush mattresses and willow walls). Erosion control activities will generally be minor in nature and completed in 2-4 days.

4) Maintenance and Repair of Flood Control Structures

Annual routine maintenance and repair of Marin County flood control structures is a key objective of the RMA program. Flood control structures are defined to include all structures built or maintained by the District, including, but not limited to, weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drain or pump station inlet/outlet structures and similar structures. The maintenance, repair or rehabilitation of flood control structures does not exceed 100 linear feet upstream or downstream of each structure and does not include increasing the footprint of any structure.

5) Levee Maintenance and Repair

Levee maintenance includes mowing levee tops and banks above the high water line for fire fuel reduction, stabilizing levees by placing fill on the levee tops, and controlling burrowing rodent populations. Levee stabilization may occur on any levee maintained by the District; a landowner access agreement is required for activities at site 7-GAL on the Santa Venetia levee, which is private property. If a gopher infestation occurs, the gophers are trapped and their burrows are filled with an earth/concrete mix or bentonite, following FEMA guidelines. The County of Marin does not use rodenticides or other poisons in rodent control for levee maintenance or in any other RMA program activity.

PROGRAM IMPLEMENTATION

Environmental Staff and Oversight

The Marin County Flood Control District will designate environmental staff who will provide day-to-day oversight of the RMA program including: 1) pre-project planning and notification to applicable resource agencies, 2) pre-project surveys for special status wildlife and plant species depending on site location and designated work windows, 3) project implementation including site surveys, conducting crew trainings, and coordinating with crews in the field, and 4) annual reporting to permitting resource agencies. The District will designate Environmental Compliance Coordinators (ECCs) to specifically oversee the biological aspects of the RMA program. The ECCs shall have an understanding of biological resources, permit regulations that may affect listed species and/or water quality, familiarity with the maintenance activities, and how to implement Avoidance and Minimization Measures and BMPs in the field. The ECCs will

ordinate activities with input and review from County of Marin Public Works' staff biologists.

A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the project's potential impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Avoidance and Minimization Measures (AMMs) to be employed at each project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

General and activity-specific conditions, AMMs and BMPs are incorporated into the overall project description and spelled out in the individual project fact sheets for each site. The job of the ECCs is to ensure that all measures are employed as prescribed in the field, depending on the location and nature of the activity.

Schedule and Timing of Maintenance Activities

The Routine Maintenance Activities Program is implemented annually throughout the project area in East Marin County. The general work window for RMA activities is the dry season, from April 15th to October 15th, depending on weather. Dry years may mean a longer work season; wet weather may halt the work season early. Table 1 below shows the Special Status Species potentially found within the project area and the established work windows for each species relative to the proposed work periods. As a general rule, work at each site will be scheduled around relevant work windows to avoid impacts. In instances where work needs to be scheduled outside of an established work window for a particular species in a specific location, species-specific pre-construction surveys will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of oidance and Minimization Measures before proceeding. In all cases, all routine maintenance activities shall be nducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality.

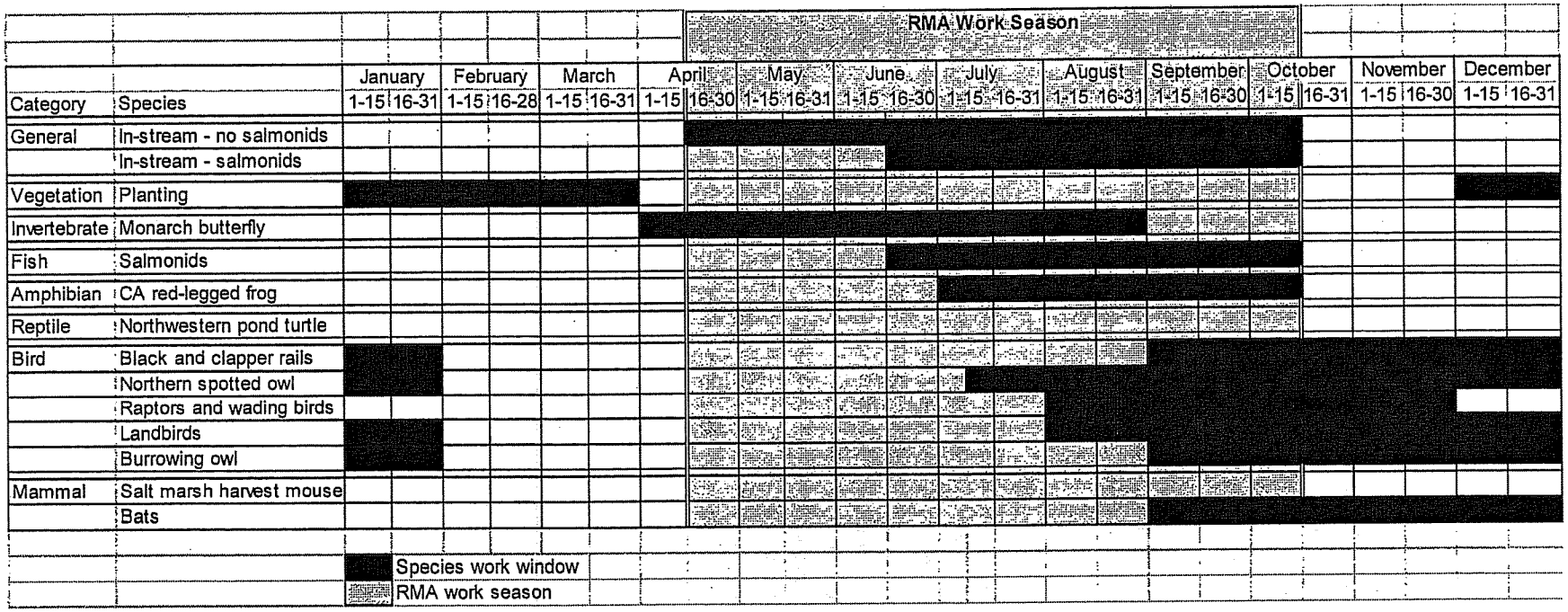


Table 1. Environmental Work Window for Special Status Species relative to the work season for implementation of the RMA Program.

Responsible Parties and Program Partners

Marin County Flood Control and Water Conservation District (District)- The Marin County Flood Control and Water Conservation District is the primary proponent for the RMA program, which utilizes the labor and expertise of the County of Marin Department of Public Works (DPW), County road maintenance crews, Conservation Corps North Bay crews (CCNB), and private contractors to manage and implement routine maintenance activities. The Marin County Flood Control and Water Conservation District (District) was formed in 1955 by an act of the California State Legislature with the primary purpose of controlling flood and storm waters of streams which flow within and into the county. The Marin County Board of Supervisors sits as its board and the District is staffed by the County of Marin Department of Public Works (DPW). The boundaries of the District are contiguous with those of the county and eight flood control zones have been established to address specific issues related to flooding within individual watersheds.

County of Marin Department of Public Works Road Crew (DPW)- DPW road maintenance crews perform a portion of the vegetation management, sediment removal, erosion control, and facility maintenance activities.

Marin County Parks - *The District coordinates with Marin County Parks to perform vegetation maintenance activities on certain lands under their jurisdiction.*

Conservation Corps North Bay (CCNB)- Conservation Corps North Bay is a non-profit job training and educational organization which has been operating in Marin County since 1982. CCNB will be the primary active partner and contractor with the District for many of the activities included in the RMA program. CCNB Maintenance Supervisors and staff will be trained annually by the District staff to incorporate the general and activity-specific conditions, AMMs, and BMPs required for each activity at each site in order to protect water quality, habitat and special status species.

Municipal Partners- Cities of Mill Valley, Novato, Larkspur, Ross, Fairfax, and San Anselmo- In addition to the work it oversees directly on County unincorporated lands, the District has a formal agreement with the City of Mill Valley that enables the City of Mill Valley to perform routine flood control maintenance activities on an annual basis on properties that fall within the District's flood control easements. In Novato, the District performs flood control maintenance activities in areas within the City of Novato's jurisdiction. The District is currently negotiating similar agreements for the District to conduct maintenance activities on a routine basis within the smaller municipalities of the Ross Valley (Cities of Larkspur, Ross, San Anselmo and Fairfax.

MCSTOPPP and STRAW- The District partners with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP) and the Point Reyes Bird Observatory's (PRBO) Students and Teachers Restoring a Watershed (STRAW) to perform restoration work in eastern Marin County. Activities consist primarily of removal of invasive plants and planting of native species by groups of teachers and students organized by STRAW.

Private Contractors - District environmental staff will work with outside contractors prior to implementing activities covered by the RMA. The ECC will be responsible for making sure that hired contractors understand what materials they need to have in hand and what methods to employ when implementing prescribed AMM's and BMPs during and post-construction. Companies contracting with the County of Marin for RMA program activities will be held to standards described in the Specifications that are included in their County contracts.

Foundation Documents for the RMA

The RMA program is largely based on program documents and studies previously developed by the Bay Area Stormwater Management Agencies Association (BASMAA). The District, as a member of MCSTOPPP, has been an active member of BASMAA since 1989. BASMAA is a consortium of 90 Bay Area county and city governments, local water and sanitation districts, and state agencies and was formed in response to the National Pollutant Discharge Elimination System (NPDES) permitting program to promote regional consistency. In 1998, BASMAA formed an Operational Permit Committee (OPC) which worked for several years to develop a Regional General Permit with the USACE to cover routine maintenance activities in flood control channels within BASMAA's jurisdictional areas. Although a Regional General Permit was not obtained, the OPC produced several documents which have been used by several BASMAA members to obtain individual permits. In addition to previous documents developed for BASMAA, the District commissioned a Biologic Assessment for the RMA program. Biological Assessment for Routine Flood Control Maintenance Activities; Marin County, California (July 2011).

The District is utilizing the information in these documents to support programmatic permit applications to the Department of Fish and Game, the Army Corps of Engineers, and the Regional Water Quality Control Board for the RMA program.

- Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works. July 2011.
- Minimal Threat Channel and Basin Maintenance Activities. October 2009. This document describes routine flood control maintenance activities.
- Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. October 2006. This document describes the environmental setting, special status species within the BASMAA jurisdictional area, the extent and scope of proposed activities, and a suite of AMMs and BMPs.
- Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities. June 2000. The manual describes BMPs for equipment and vehicles, sediment control, soil stabilization, natural resource protection and restoration, vegetation and debris management, and water diversions.

III. CIRCULATION AND REVIEW

A. Responsible Agencies: *(agencies whose approval is required and permits needed)*

- U.S. Army Corps of Engineers – Section 404 permit under the Clean Water Act with consultation from the U.S. Fish and Wildlife Service (Endangered Species Act of 1973, as amended) and NOAA Fisheries (Endangered Species Act of 1973, as amended);
- San Francisco Bay Regional Water Quality Control Board – Section 401 Water Quality Certification; and
- California Department of Fish and Game - 1600 Streambed Alteration Agreement Programmatic Routine Maintenance Agreement.

DOCUMENTS INCORPORATED BY REFERENCE

The following is a list of relevant information sources, which have been incorporated by reference into the foregoing Initial Study pursuant to Section 15150 of the State CEQA Guidelines. The number assigned to each information source corresponds to the number listed in parenthesis following the incorporating topical question of the Initial Study checklist. These documents are both a matter of public record and available for public inspection at the County of Marin. Copies of Documents (1-2) below are available for public review at the County of Marin Planning Department (Room 308), 3501 Civic Center Drive, San Rafael, California, Monday through Friday between the hours of 8:00 a.m. to 4:00 p.m. Copies of documents (3-8) are available for public review at the Marin County Public Works Department (Room 304) or at the Marin County website www.marinwatersheds.org. Copies of Documents (9 – 10)) can be found on-line at the individual municipal websites.

1) Marin Countywide Plan, Marin County Community Development Agency, Planning Division (2007).

2) Marin County Code; Supp. No. 6-11, Update 1; (June 7, 2011).

3) A Programmatic Approach to Routine Flood Control Maintenance Activities; County of Marin (October 2011).

4) Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works. (October 2011).

5) Minimal Threat Channel and Basin Maintenance Activities. BASMAA OPC (October 2009).

6) Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. BASMAA OPC October 2006.

7) Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities. BASMAA OPC, (June 2000).

8) County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries; FishNet 4C; Dec 2004; updated 2007)

9) City of Mill Valley General Plan (1989).

10) City of Novato General Plan (1996).

IV. EVALUATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to Section 15063 of the State CEQA Guidelines, and the County EIR Guidelines, Marin County will prepare an Initial Study for all projects not categorically exempt from the requirements of CEQA. The Initial Study evaluation is a preliminary analysis of a project which provides the County with information to use as the basis for deciding whether to prepare an Environmental Impact Report (EIR) or Negative Declaration. The points enumerated below describe the primary procedural steps undertaken by the County in completing an Initial Study checklist evaluation and, in particular, the manner in which significant environmental effects of the project are made and recorded.

A. The determination of significant environmental effect is to be based on substantial evidence contained in the administrative record and the County's environmental database consisting of factual information regarding environmental resources and environmental goals and policies relevant to Marin County. As a procedural device for reducing the size of the Initial Study document, relevant information sources cited and discussed in topical sections of the checklist evaluation are incorporated by reference into the checklist (e.g. general plans, zoning ordinances). Each of these information sources has been assigned a number which is shown in parenthesis following each topical question and which corresponds to a number on the data base source list provided herein as Attachment A. See the sample question below. Other sources used or individuals contacted may also be cited in the discussion of topical issues where appropriate.

B. In general, a Negative Declaration shall be prepared for a project subject to CEQA when either the Initial Study demonstrates that there is no substantial evidence that the project may have one or more significant effects on the environment. A Negative Declaration shall also be prepared if the Initial Study identifies potentially significant effects, but revisions to the project made by or agreed to by the applicant prior to release of the Negative Declaration for public review would avoid or reduce such effects to a level of less than significance, and there is no substantial evidence before the Lead County Department that the project as revised will have a significant effect on the environment. A signature block is provided in Section VII of this Initial Study to verify that the project sponsor has agreed to incorporate mitigation measures into the project in conformance with this requirement.

C. All answers to the topical questions must take into account the whole of the action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts. Significant unavoidable cumulative impacts shall be identified in Section VI of this Initial Study (Mandatory Findings of Significance).

D. A brief explanation shall be given for all answers except "Not Applicable" answers that are adequately supported by the information sources the Lead County Department cites in the parenthesis following each question. A "Not Applicable" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "Not Applicable" answer shall be discussed where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

E. "Less-than-significant Impact" is appropriate if an effect is found to be less-than-significant based on the project as proposed and without the incorporation of mitigation measures recommended in the Initial Study.

F. "Potentially Significant Unless Mitigated" applies where the incorporation of recommended mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less-than-significant Impact." The Lead County Department must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from Section V, "Earlier Analyses", may be cross-referenced).

F. "Significant Impact" is appropriate if an effect is significant or potentially significant, or if the Lead County Department lacks information to make a finding that the effect is less-than-significant. If there are one or more effects which have been determined to be significant and unavoidable, an EIR shall be required for the project.

G. The answers in this checklist have also considered the current California Environmental Quality Act Guidelines and the Initial Study Checklist contained in those Guidelines.

H. This Initial Study checklist was prepared consistent with current California Environmental Quality Act Guidelines and the Initial Study checklist contained in those Guidelines.

V. ISSUES *(for source #(s) see: Documents Included by Reference; Page 13)*

1. LAND USE AND PLANNING. *Would the proposal:*

a) Conflict with applicable Countywide Plan designation or zoning standards? (source #(s): 1, 2)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The determinations of policy consistency as discussed in this Initial Study section represent County staff interpretation of policies. However, this Initial Study does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

Section 15358(b) of the CEQA Guidelines states that "effects analyzed under CEQA must be related to a physical change in the environment", however policy inconsistencies may not necessarily indicate significant environmental effects Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environment are considered significant impacts pursuant to CEQA. Where potentially significant environmental impacts are raised in the discussion below, they have been mitigated to a less-than-significant impact and, therefore, project activities are determined to be consistent with the relevant policies cited. Mitigations are addressed further in the topical impact sections following the plan, policies and regulations analyses.

LOCAL PLANS, POLICIES, AND REGULATIONS

Land use designations and development of the project sites are governed by the objectives and policies of the 2007 Marin Countywide Plan (CWP), sections of the Marin County Code, including Title 22 (Zoning) and Title 23 (Natural Resources) and Title 24 (Development Standards). And General Plans for local municipal program partners including; City of Novato, City of Mill Valley, Town of Ross, City of Larkspur, Town of San Anselmo and the Town of Fairfax.

MARIN COUNTY CODE

TITLE 22- DEVELOPMENT CODE; Chapter 22.27- Native Tree Protection and Preservation

Section 22.27.040 (k)- Exemption to the Prohibition of Removal of a Protected Tree states that the project proponent must demonstrate that the tree removal is by a public agency to provide for the routine management and maintenance of public land.

Consistent- The project is consistent with the Marin County Code (Title 22) which requires projects to minimize tree removal and grading, as well as to maintain adequate site features that establish the visual character of the site. Marin County Flood Control District during RMA Program implementation, will minimize any riparian tree removal unless absolutely necessary to achieve the goals of the program, which are to protect the public and public facilities from flooding, while protecting water quality and sensitive habitats. To protect sites that are environmentally sensitive, the District will employ a suite of Avoidance and Minimization

Measures and Best Management Practices to protect existing habitats and species of concern. Therefore, the project is consistent with the development standards set forth in Title 22.

TITLE 23- NATURAL RESOURCES;

The provisions of Title 23 are enacted to protect and promote the public health, safety and general welfare, to preserve environmental qualities, and to protect the value, worth and enjoyment of the use of real property to the fullest extent possible, through the regulation of the uses or activities of the property in a manner which will prevent serious public injury.

Chapter 23.08 Excavating, Grading, and Filling
Chapter 23.08 establishes regulations for excavation, grading and filling in order to:

(1) Preserve and enhance the natural beauties of the land, streams, bays and shorelines;
(2) Reduce or eliminate the hazards of earth slides, mudflows, rock falls, undue settlement, erosion, siltation, sedimentation and flooding;
(3) Protect and enhance the water quality of watercourses, water bodies and wetlands and vegetation for wildlife habitat;
(4) Regulate de facto development caused by uncontrolled grading.

Activities of this nature which are considered exempt from the provisions of this chapter include:
(a) Grading done by or on behalf of a public agency that assumes full responsibility for the work.

Consistent: The project as described will be implemented by the County of Marin Flood Control District, local municipalities or private contractors under contract with the District. The District is a public agency and assumes full responsibility for the work conducted under the RMA program, therefore the program is exempt from the terms of Chapter 23.08, and consistent with the requirements of this section of County code.

Chapter 23.09 Floodplain Management
It is the purpose of Chapter 23.09 to promote the public health, safety and general welfare and to minimize the losses described in this section by provisions designed to:

(A) Protect human life and health;
(B) Minimize expenditure of public money for flood control projects;
(C) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
(D) Minimize prolonged business interruptions;
(E) Minimize damage to public facilities and utilities, such as water located in areas of special flood hazard;
(F) Help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
(G) Ensure that potential buyers are notified that property is in an area of special flood hazard; and
(H) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

(2) In order to accomplish its purposes, Chapter 23.09 includes methods and provisions for:

(A) Restricting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
(B) Requiring that uses vulnerable to flood, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
(C) Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
(D) Controlling filling, grading, dredging and other development which may increase flood damage; and
(E) Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Consistent- The project is consistent with the Marin County Code Title 23 which was enacted to protect and promote the public health, safety and general welfare, and to preserve environmental qualities in a manner which would prevent serious public injury. The objective of the project is to promote flood control and minimize risk to public health, safety and welfare. The program as designed will minimize potential impacts to sensitive habitats and will be designed to blend into the surrounding natural environment to the greatest extent feasible. The proposed flood control project incorporates practices which enhance the biological and visual character of the creek corridor. Although some trimming of riparian trees will occur to prevent flooding, the project will not alter the riparian character of the project sites. The implementation of the proposed program will respect the surrounding natural environment and return channel elevations to their previous condition prior to sedimentation.

In summary, the proposed project is maintenance in nature, and will not change the Land Use Designations at the project sites or conflict with zoning standards or the objectives of the above-mentioned code in any way; therefore, the project will be consistent with applicable Marin County Code.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Conflict with applicable environmental plans or policies adopted by Marin County? (source #(s): 1)	[ ]	[X]	[ ]	[ ]

MARIN COUNTYWIDE PLAN (2007)

Specific Countywide Plan policies which pertain to the proposed project are associated with the following subjects:

(1) Include Resource Preservation in Environmental Review;
- BIO- 2.1 Include Resources Protection in Environmental Review

(2) Coordinate with Trustee Agencies and Promote Early Consultation with Agencies;
- BIO-2.8 Coordinate with Trustee Agencies during environmental review when special-status species, sensitive natural communities, or wetlands may be affected.
- BIO-2.9 Promote early consultation with other agencies.

(3) Protection of Riparian Systems

- BIO-1.5 Promote Use of Native Plant Species
- BIO-1.7 Remove Invasive Exotic Plants
- BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials
- BIO-4.6 Control Exotic Vegetation
- BIO-4.7 Protect Riparian Vegetation

(4) Protection of Stream Conservation Areas

- BIO- 4.4 Promote Natural Stream Channel Function
- BIO-4.5 Restore and Stabilize Stream Channels
- BIO-4.10 Promote Interagency Cooperation
- BIO-4.19 Maintain Channel Stability

(5) Species and Habitat Preservation

- BIO-1.1 Protect Wetlands, Habitat for Special -Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors.
- BIO-1.3 Protect Woodlands, Forests, and Tree Resources
- BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors.
- BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season
- BIO-2.7 Protect Sensitive Coastal Habitat.
- BIO-5.3 Leave Tidelands in the Natural State
- BIO-5.5 Protect Freshwater Habitats
- BIO-5.6 Use Flood Basins for Seasonal Habitat

(6) Protection of Watersheds and Water Quality

- WR-1.1 Protect Watersheds and Aquifer Recharge
- WR-2.3 Avoid Erosion and Sedimentation
- WR-2.4 Design County Facilities to Minimize Pollutant Input

(7) Avoidance of Environmental Hazards

- EH-2.1. Avoid Hazard Areas
- EH-3.2. Retain Natural Conditions
- EH-4.1. Limit Risks to Structures
- EH-4.2 Remove Hazardous Vegetation

(8) Protection of Air Quality

- AIR-2.0 Protection from Emissions
- AIR-5.0 Adaptation to Climate Change

(9) Minimize Noise Impacts;

- NO-1.3 Regulate Noise Generating Activities

(10) Protection of Visual Resources

- DES-4.1. Preserve Visual Quality

(11) Avoid Impacts to Historical Resources;

- HAR-1.3. Avoid Impacts to Historical Resources

CONSISTENCY OF PROJECT WITH EXISTING MARIN COUNTYWIDE PLAN POLICIES

(1) Include Resource Preservation in Environmental Review

BIO-2.1 Include Resource Preservation in Environmental Review *to assess the impact of proposed development on native species and habitat diversity, particularly special-status species, sensitive natural communities, wetlands, and important wildlife nursery areas and movement corridors. Require adequate mitigation measures for ensuring the protection of any sensitive resources and achieving "no net loss" of sensitive habitat acreage, values, and functions.*

Consistent: The Marin County Department of Public Works (DPW) developed a biological assessment for the RMA program which evaluated potential impacts to native species, habitat diversity and special-status species and natural communities (Biological Assessment for Routine Flood Control Maintenance Activities; July 2011). The objective of the biological assessment was to identify adequate measures to protect any sensitive resources and achieve "no net loss" of sensitive habitat acreage, values, and functions. Prescriptions contained in the Biological Assessment include species related Avoidance and Minimization Measures as well as Special Conditions and Best Management Practices to be employed during project implementation. The project is guided by these prescriptions from the Biological Assessment so therefore, the project will be consistent with Policy BIO-2.1.

(2) Coordinate with Trustee Agencies and Promote Early Consultation with Other Agencies

BIO-2.8 Coordinate with Trustee Agencies. *Consult with trustee agencies (the California Department of Fish and Game, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration (NOAA) Fisheries, U.S. Army Corps of Engineers, Environmental Protection Agency, Regional Water Quality Control Board, and Bay Conservation and Development Commission) during environmental review when special-status species, sensitive natural communities, or wetlands may be adversely affected.*

BIO-2.9 Promote Early Consultation with Other Agencies. *Require applicants to consult with all agencies with review authority for projects in areas supporting wetlands and special-status species at the outset of project planning.*

Consistent: DPW has coordinated the development and review of this project and its associated environmental documents with natural resource trustee agencies who require permits for the proposed work. Permitting agencies include the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), the California Department of Fish and Game for all sites. A select number of sites will need permits from the U.S. Army Corps of Engineers with consultation with U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. Regulatory permit applications have been submitted to all these agencies. Project coordination with these regulatory agencies and notification to all interested parties and the general public will continue throughout the public review process. Therefore, the project is consistent with Policies BIO-2.8 and BIO-2.9.

(3) Protection of Riparian Systems

BIO-1.5 Promote Use of Native Plant Species. *Encourage use of a variety of native or compatible non-native, non-invasive plant species indigenous to the site vicinity as part of project landscaping to improve wildlife habitat values.*

BIO-1.7 Remove Invasive Exotic Plants. *Require the removal of invasive exotic specie, to the extent feasible, when considering applicable measures in discretionary permit approvals for development projects unrelated to agriculture, and include monitoring to prevent re-establishment in managed areas.*

BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials. *Encourage the use of integrated pest management and organic practices to manage pest with the least possible hazard to the environment. Restrict the use of insecticide, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared; the habitat itself is threatened; a substantial risk to public health and safety exists, including maintenance for flood control; or such use is authorized pursuant to a permit issues by the agricultural commissioner. Encourage non-toxic strategies for pest control, such as habitat management using physical and biological control, as an alternative to chemical treatment, and allow use of toxic substances only after approaches have been tried and determines unsuccessful. Continue to implement the Integrated Pest Management ordinance for county-related operations.*

BIO- 4.6 Control Exotic Vegetation. *Remove and replace invasive exotic plants with native plants as part of stream restoration projects and as a condition of site-specific development approval in than SCA and include monitoring to prevent reestablishment.*

BIO-4.7 Protect Riparian Vegetation. *Retain riparian vegetation for stabilization of stream banks and floodplains, moderating water temperatures, trapping and filtering sediments and other water pollutants, providing wildlife habitat, and aesthetic reasons.*

Consistent: Vegetation management activities are employed to achieve three main goals: maintain channels, reduce fire fuels, and restore creek habitat by removing invasive non-native plants and re-vegetating with native plants. Maintaining channel function is achieved by limbing and trimming, cattail cutting, removing vegetation from channel bottoms, and clearing trash. These activities occur from the channel bottom to the top of the high water mark, and include trimming tree limbs from trees and shrubs growing in the channel and trimming branches that hang down into the active channel. These activities employ vegetation control methods such as cutting and removing vegetation above the ground by hand or with loppers, hand saws, chainsaws, pole saws, weed eaters and other hand tools. Bladed weed-eaters are used to cut cattails. Fire fuel reduction is achieved by mowing on tops of banks and levees, removal of fallen trees, removal of standing dead trees, and thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas. Tree removal and thinning employ a mix of tools including chainsaws, loppers, hand saws, pole saws, hedge trimmers, and other hand tools.

Tree removal is a rare event. Program BIO-4f of the Countywide Plan recognizes that tree growth may be cleared from the stream channel where removal is essential to protect against property damage or prevent safety hazards Removal of mature, healthy, native trees is only indicated when pruning is insufficient to reduce unacceptably high hydraulic roughness in the channel. For

example, an arroyo willow growing on a newly established gravel bar may need to be removed if it threatens to block flow through a structure. Removal of sick, dying, or dead trees is indicated when they reduce channel capacity, increase flood hazard, and/or are a safety hazard to adjacent structures. Tree health and hazard potential will be determined by appropriate environmental staff (arborist or biologist). Snags shall be left in place to provide habitat for birds and small mammals if they do not otherwise pose a flood or safety hazard. Staff will consult with CDFG whenever possible if tree removal is necessary, and retention of large wood debris in the creeks will follow CDFG protocols.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program. Since 1999 STRAW has restored 7,159 linear feet (5.9 acres) of riparian corridor along east Marin creeks, removing invasive non-native plants and revegetating with natives to restore streamside habitat. The STRAW Program is included as a partner in the Marin County Flood Control District's Routine Maintenance Program (RMA).

Overall, the vegetation removal within flood control creeks and drainages will be the minimum amount necessary to clear these areas of obstructions. As discussed in detail in Sections V. 7, the proposed project will adhere to the mitigation measures outlined in that section, ensuring that the project would have less-than-significant impacts on riparian systems or the plants and animals that inhabit the riparian zone. Therefore, the project has been mitigated to consistency with Policies BIO-1.5, BIO-1.7, BIO-1.8, BIO-4.6 and BIO-4.7.

(4) Protection of Stream Conservation Areas

BIO-4.1 Restrict Land Use in Stream Conservation Areas. *A Stream Conservation Area (SCA) is established to protect the active channel, water quality and flood control functions, and associated fish and wildlife habitat values along streams. Development shall be set back to protect the stream and provide an upland buffer, which is important to protect significant resources that may be present and provide a transitional protection zone. Best management practices shall be adhered to in all designated SCAs. Best management practices are also strongly encouraged in ephemeral streams not defined as SCAs.*

Allowable uses in SCAs in any corridor consist of the following, provided they conform to zoning and all relevant criteria and standards for SCAs, as follows:

- Existing permitted or legal nonconforming structures or improvements, their repair, and their retrofit within the existing footprint;
- Projects to improve fish and wildlife habitat;
- Driveway, road and utility crossings, if no other location is feasible;
- Water monitoring installations;
- Passive recreation that does not significantly disturb native species;
- Necessary water supply and flood control projects that minimize impacts to stream function and to fish and wildlife habitat;
- Agricultural uses that do not result in any of the following:
  a. The removal of woody riparian vegetation;

b. The installation of fencing within the SCA that prevents wildlife access to the riparian habitat within the SCA;
c. Animal confinement within the SCA; and
d. A substantial increase in sedimentation.

BIO-4.4 Promote Natural Stream Channel Function. *Retain and, where possible, restore the hydraulic capacity and natural functions of stream channels in SCAs. Discourage alteration of the bed or banks of the stream, including filling, grading, excavating, and installation of storm drains and culverts. When feasible replace impervious surfaces with pervious surfaces. Protect and enhance fish habitat, including through retention of large woody debris, except in cases where removal is essential to protect against property damage or prevent safety hazards. In no case shall alterations that create barriers to fish migration be allowed on streams mapped as historically supporting salmonids. Alteration of natural channels within SCAs for flood control shall be designed and constructed in a manner that retains and protects the riparian vegetation, allows for sufficient capacity and natural channel migration, and allows for reestablishment of woody trees and shrubs without compromising the flood flow capacity where avoidance of existing riparian vegetation is not possible.*

BIO- 4.5 Restore and Stabilize Stream Channels. *Pursue stream restoration and appropriate channel redesign where sufficient right-of-way exists that includes the following: a hydraulic design, a channel plan form, a composite channel cross-section that incorporates low flow and bankfull channels, removal and control of invasive exotic plant species, and bio-technical bank stabilization methods to promote quick reestablishment of riparian trees and other native vegetation.*

BIO-4.10 Promote Interagency Cooperation. *Work in close cooperation with flood control districts, water districts, and wildlife agencies in the design and choice of materials for construction and alterations within SCAs.*

Consistent: Many of the channels included in the project areas are subject to protection under the Stream Conservation Area protection policies as set forth in the Countywide Plan. As discussed in Section V. 3. (c) And V. 11. (d, e), the proposed project is a flood control project that will maintain functioning channels for conveyance of water flow, minimize impacts to fish and wildlife habitat and reduce risk of fire and flooding. Thus, it is a permitted activity within the SCA, as set forth in the Countywide Plan Policy BIO-4.1 Excavation of accumulated sediment, selective vegetation removal within the creeks, channels and drainage ditches at the project sites, and minimal streambank stabilization where needed will work to restore the hydraulic and natural functions of project drainages to reduce the risk of flooding, thus the project is consistent with Polices BIO-4.4 and 4.5. The project promote interagency cooperation in that it will be implemented by the Marin County Flood Control District in collaboration with local municipalities including the Cities of Mill Valley, Larkspur, Ross, San Anselmo, Fairfax and Novato. Permits for the project will be issued by the trustee agencies including the Department of Fish and Game, the US Army Corps of Engineers, the Regional Water Quality Control Board, the US Fish and Wildlife Service and the National Marine Fisheries Service.

(5) Species and Habitat Preservation

BIO-1.1 Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors. *Protect sensitive biological resources, wetlands, migratory species of the Pacific Flyway, and wildlife movement corridors through careful environmental review of proposed development applications, including consideration of cumulative impacts, participation in comprehensive habitat management programs with other local and resource agencies, and continue acquisition and management of open space lands that provide for permanent protection of important natural habitats.*

BIO-1.3 Protect Woodlands, Forests, and Tree Resources. *Protect large native trees, trees with historical importance; oak woodlands; healthy and safe eucalyptus groves that support colonies of monarch butterflies, colonial nesting birds, or known raptor sites; and forest habitats. Prevent the untimely removal of trees through the implementation of standards in the Development Code and Native Tree Preservation and Protection Ordinance. Encourage other local agencies to adopt tree preservation ordinances to protect native trees and woodlands, regardless of whether they are located in urban or undeveloped areas*

BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors. *Ensure that important corridors for wildlife movement and dispersal are protected as a condition of discretionary permits, including consideration of cumulative impacts. Features of particular importance to wildlife for movement may include riparian corridors, shorelines of the coast and bay, and ridgelines. Linkages and corridors shall be provided that connect sensitive habitat areas such as woodlands, forests, wetlands, and essential habitat for special-status species, including an assessment of cumulative impacts.*

BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season. *Limit construction and other sources of potential disturbance in sensitive riparian corridors, wetlands, and baylands to protect bird nesting activities. Disturbance should generally be set back from sensitive habitat during the nesting season from March 1 through August 1 to protect bird nesting, rearing, and fledging activities. Pre-construction surveys should be conducted by a qualified professional where development is proposed in sensitive habitat areas during the nesting season, and appropriate restrictions should be defined to protect nests in active use and ensure that any young have fledged before construction proceeds.*

BIO-2.7 Protect Sensitive Coastal Habitat. *Protect coastal dunes, streams, and wetlands, and sensitive wildlife habitat from development in accordance with coastal resource management standards in the development code.*

BIO-5.1 Protect the Baylands Corridor. *Ensure that baylands and large, adjacent essential uplands are protected, and encourage enhancement efforts for baylands, including those in the baylands corridor.*

BIO-5.3 Leave Tidelands in Their Natural State. *Require that all tidelands be left in their natural state to respect their biological importance to the estuarine ecosystem. Any modifications should be limited to habitat restoration or enhancement plans approved by regulatory agencies.*

BIO-5.5 Protect Freshwater Habitats. *Preserve and where possible expand habitats associated with freshwater streams, seasonal wetlands, and small former marshes to facilitate the circulation, distribution, and flow of fresh water, and to enhance associated habitat values.*

BIO-5.6 Use Flood Basins for Seasonal Habitat. *Utilize natural or manage man-made flood basins to provide seasonal habitat for waterfowl and shorebirds and prohibit development in these basins to protect habitat values.*

Consistent: A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the project's potential impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Avoidance and Minimization Measures (AMMs) to be employed at each project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

General and activity-specific conditions, AMMs and BMPs are incorporated into the overall RMA project description and spelled out in the individual project fact sheets for each site. An Environmental Compliance Coordinator (ECC) will work with the project on a daily basis to ensure that all AMMs and BMPs are implemented as prescribed in the field, depending on the location and nature of the activity. The ECC will be on-site to monitor the outcome of all conservation measures to assure protection of all fish and wildlife species and their habitats

As prescribed in the Biological Assessment, pre-construction surveys for special-status animal and plant species will be completed at individual sites as necessary depending on work windows and seasonal conditions. If surveys confirm species occurrence at a project site, a biologist will oversee all construction work and implement appropriate conservation measures to protect these species. If necessary, avoidance of work areas and stop work orders will be employed if impacts to sensitive species and their habitat cannot be mitigated to a less-then-significant level or avoided completely. As discussed in detail in Sections V. 7. (a, b, c), the proposed project, will adhere to the mitigation measures outlined in those sections, ensuring that the project would have less-than-significant impacts on all special-status species, wildlife and habitat diversity. Therefore, the project has been mitigated to consistency with Policies BIO-1.1, BIO-1.3, BIO-2.4, BIO-2.5, BIO-2.7.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program. Since 1999 STRAW has restored 7,159 linear feet (5.9 acres) of riparian corridor along east Marin creeks, removing invasive non-native plants and revegetating with natives to restore streamside habitat. The STRAW Program is included as a partner in the Marin County Flood Control District's Routine Maintenance Program (RMA).

Sensitive natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection (i.e., §404 of the Clean Water Act and/or the §§1600 et seq. of the California Fish and Game Code). Within the project sites, two

sensitive natural communities have the potential to be affected by project activities: northern coastal salt marsh and coastal brackish marsh (CDFG 2011). These communities are found within or adjacent to some of the project sites and are expected to fall under federal and/or state jurisdictions as wetlands or waters of the U.S. or waters of the state. Wetlands and Other Waters of the U.S. Wetlands and other aquatic resources such as riparian areas and certain aquatic vegetation communities are considered sensitive biological resources and can fall under the jurisdiction of several regulatory agencies. Wetlands are generally defined by the USACE as "those areas that are inundated or saturated by surface or ground water... that under normal circumstances support a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 [b]). Indicators of three wetland parameters determined by field investigation must be present for a site to be classified as a wetland by the USACE; these are hydric soils, hydrophytic vegetation, and wetlands hydrology. Approximately one third of the sites have been initially identified as possibly meeting the USACE definition of wetlands. A formal wetlands delineation for those 38 sites will be completed in Spring or Summer 2012. Mitigation measures to protect these sites are outlined in Section 7 below. In tideland areas maintenance work will be limited to that which is absolutely necessary to restore flow through to the tidelands from upland drainage areas (e.g. clearing sediment from culvert outfalls). The minimal amount of work proposed in the tidelands area will be conditioned by permits issued by the Department of Fish and Game (1600 Streambed Alteration Agreement) and the Army Corps of Engineers (404 permit), with consultation from US Fish and Wildlife Service the National Marine Fisheries Service, and the Regional Water Quality Control Board (401 Certification). General and activity-specific conditions, AMMs and BMPs prescribed for all project sites located in tideland areas will mitigate the project's impacts to less-than-significant, therefore, the project will be consistent with Policies BIO-5.1, BIO-5.3, BIO-5.5, and BIO-5.6.

(6) Protection of Watersheds and Water Quality

WR-1.1. Protect Watersheds and Aquifer Recharge. *Give high priority to the protection of watersheds, aquifer-recharge areas, and natural drainage systems in any consideration of land use.*

WR-2.3. Avoid Erosion and Sedimentation. *Minimize soil erosion and discharge of sediments into surface runoff, drainage systems, and water bodies. Continue to require grading plans that address avoidance of soil erosion and on-site sediment retention. Require developments to include on-site facilities for the retention of sediments, and, if necessary, require continued monitoring and maintenance of these facilities upon project completion.*

WR-2.4 Design County Facilities to Minimize Pollutant Input. *Design, construct, and maintain County building, landscaped areas, roads, bridges, drainages, and other facilities to minimize the volume of toxic, nutrients, sediment, and other pollutants in stormwater flows, and continue to improve road maintenance methods to reduce erosion and sedimentation potential.*

Consistent: Implementation of this project will help to restore the normal drainage patterns within the project area by removing accumulated sediment from the creeks, channels and drainage ditches at selected sites. There will be a temporary increase in turbidity in these drainages as sediment is disturbed from the dredging process. These impacts will be short-term and localized over the 1-7 day sediment removal project period. DPW will use Best Management Practices (BMPs) outlined in the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance. These BMPs include minimizing loss of

native vegetation, conducting the work from the road whenever possible, timing the work prior to the rainy season, minimizing sediment disturbance and suspension within the water, taking all excavated material to an upland disposal site, and sediment/erosion controls to keep excess soil from washing or blowing away during removal, transport and storage (including sediment traps, silt fences, coir logs and wattles containing weed-free rice straw, as necessary). Dewatering will be conducted in a manner to reduce turbidity downstream of the project area. To prevent streambed erosion from the use of cofferdams, pipes and pumps used to de-water the creek, diversion pipe outlets shall be placed on hard surfaces or temporary outfall dissipation structures shall be installed (i.e. rock piles). No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start-up of any phase of the project that may result in sediment run-off to the stream. If rainfall is predicted, erosion control measures must be kept on-site and be in place prior to the onset of precipitation. As discussed in detail in Sections V. 3. (b) and V. 4. (c), the proposed project will adhere to the mitigation measures outlined in those sections, ensuring that the project would have less-than-significant impacts on water quality and watersheds. Therefore, the project has been mitigated to consistency with Policies WR-1.1, 2.3 and 2.4.

(7) Avoidance of Environmental Hazards

EH-2.1. Avoid Hazard Areas. *Require development to avoid or minimize potential hazards from earthquakes and unstable ground conditions.*

EH-3.2. Retain Natural Conditions. *Ensure that flow capacity is maintained in stream channels and floodplains, and achieve flood control using biotechnical techniques instead of storm drains, culverts, riprap, and other forms of structural stabilization.*

EH-4.2 Remove Hazardous Vegetation. *Abate the build-up of vegetation around existing structures or on vacant properties that could help fuel fires.*

Consistent: The RMA project is maintenance in nature and no new development or increases of footprint of existing development is proposed; therefore no increase in impacts from an earthquakes on structures is predicted for the project. This project will restore the channel function of these drainages by removing obstructing vegetation and accumulated sediment, which should reduce the potential for flooding of adjacent roadways and promote public safety of people and property from the risks associated with flooding. The proposed bank stabilization associated with the RMA uses biotechnical designs and does not include installation of rip rap or other forms of structural stabilization. Bank stabilization and channel clearing activities will be implemented in a way that maintains natural channel features and watershed functions. Mowing of levees and along top of bank in selected channel reaches is done before the July 4th holiday in order to reduce fire fuel loading and to minimize the risk of grass fires, therefore, the project will be consistent with Policies EH-2.1, 3.2 and 4.2.

(8) Protection of Air Quality

AIR-2.0. Protection from Emissions. *Minimize the potential impacts from land uses that may emit pollution and/or odors on residential and other land uses sensitive to such emissions in unincorporated Marin County.*

AIR-5.0 Adaptation to Climate Change- Adopt policies and programs that promote resilient human and natural systems in order to ease the impacts of climate change.

Consistent: The effects on air quality are from exhaust coming from heavy equipment during dredging. These impacts are short-term and temporal, occurring incrementally over the 1-7 day work periods. As discussed in Section V. 5.(a), the project would contribute minimally to air impacts; no significant negative impacts related to air quality are identified. The re-vegetation of stream banks by the STRAW program serves to sequester carbon and thus reduce the impacts of climate change. Consequently, the proposed project will be consistent with Policy AIR-2.1.

(9) Protection of Open Space and Trails

Policy TRL-1.1. Protect the Existing Countywide Trail System. Maintain the existing countywide trail system and protect the public's right to access it.

Consistent: The project will not impede access to the Countywide Trail System in any way nor will it create any impacts that will decrease the public's enjoyment of the trail system or open space areas in any way, therefore it is consistent with the Countywide Plan Policies to protect open space and trails.

(10) Minimize Noise Impacts

NO-1.3. Regulate Noise Generating Activities. Require measures to minimize noise exposure to neighboring properties, open space, and wildlife habitat from construction-related activities, yard maintenance equipment, and other noise sources, such as amplified music.

Consistent: As discussed in Section V. 10. (a, b), the noise associated with sediment removal activities is limited to the sound of heavy equipment operating during normal daytime working hours (approximately 8:00 a.m. to 4:00 p.m.). The project is short-term (approximately 1-7 days, depending on site), most of the work is not near residences and for those that are, private landowners have concurred with implementation of this flood control maintenance project on their lands and project dates will be coordinated with these landowners in advance of project commencement. Noise impacts could cause temporary disturbance to wildlife species such as songbirds that use the riparian zone. Any disturbed or flushed resident wildlife are expected to return to the project area after completion of daily construction activities. The project would contribute minimally to noise impacts; no significant impacts related to noise pollution are identified. Therefore, the project will be consistent with Policy NO-1.3.

(11) Protection of Visual Resources

DES-4.1. Preserve Visual Quality Protect scenic quality and views of the natural environment – including ridgelines and upland greenbelts, hillsides, water, and trees – from adverse impacts related to development.

Consistent: The visual resources of the project sites would not be adversely impacted by maintenance activities because the overall project is designed to respect the surrounding natural environment and return it to its previous condition (i.e., by removing aggraded sediment, fallen

trees or overgrown weeds). Some trimming of riparian trees will occur, but the maintenance project would not result in visual impacts to public or scenic views and vistas from adjacent roadways, therefore, the project will be consistent with Policy DES-4.1.

(12) Avoid Impacts to Historical Resources

HAR-1.3. Avoid Impacts to Historical Resources. Ensure that human activity avoids damaging cultural resources.

Consistent: As discussed in Sections V. 14. (a, b), the proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and some sites to be dredged have previously been dredged multiple times in the same locations. Should any cultural resources be discovered during sediment removal activities, all work shall immediately be stopped and the services of a qualified archaeologist from Sonoma State University's Cultural Resources Department shall be engaged to assess the value of the resource and to develop appropriate mitigation measures. As discussed in detail in Sections V. 14. (a), the proposed project will adhere to the mitigation measures outlined in that section, ensuring that the project would have less-than-significant impacts on historical resources. Therefore, the project has been mitigated to consistency with Policy HAR-1.3.

CITY OF MILL VALLEY GENERAL PLAN (1989)

Section 5: Public Health and Safety; PH-1: The City shall strive to ensure that all grading, site improvements and structures minimize geotechnical, seismic and flood hazards to people and property.

A large portion of developed and undeveloped Mill Valley lands are subject to flooding due to a combination of factors including periodic heavy winter rainfalls, tidal fluctuations, and potentials for tsunami and dam failure due to seismic activity. Flooding as a result of heavy rainfall can result from either of two phenomena: (1) storm water run-off inundation of lowlands due to an inadequate drainage network, and (2) high Bay tides and winds which force the storm water up stream channels. Mill Valley drains into the Richardson Bay Drainage Basin mainly by way of the Basin's major stream, Arroyo Corte Madera Del Presidio. The creek often overflows its banks in the lower reaches during a period of heavy rainfall. Significant encroachment has occurred along Arroyo Corte Madera by urban development and excessive vegetative growth. Both factors have imposed extreme limitations on channel flow capacities along substantial portions of the stream, resulting in major flood problems. Damaging floods have periodically occurred over this area as a result.

Consistent: The primary objective of the proposed RMA project within the City of Mill Valley's jurisdiction is to reduce the potential risk of flooding by maintaining the channels and removing obstructions from related flood control infrastructure such as tidegates, weirs and trash racks; therefore the RMA program is consistent with the PH-1 Policy of the City of Mill Valley General Plan.

CITY OF NOVATO GENERAL PLAN (1996)

The City of Novato General Plan contains the following policies to protect Watercourses, Wetlands, and Baylands Areas that are applicable to the proposed RMA activities that will be conducted on properties within the City of Novato jurisdiction.

CHAPTER IV- Environment; Watercourses, Wetlands, and Baylands Areas

EN Objective 1– Preserve, protect, and enhance streams and other bodies of water.

EN Policy 1 Ecology of Creeks and Streams. *Preserve and enhance the ecology of creeks and streams.*

EN Policy 2 Vegetation in Watercourse Areas. *Protect vegetation in watercourse areas.*

EN Policy 3 Wildlife Habitat. *Endeavor to preserve and enhance wildlife habitat areas in watercourse areas and control human use of these areas as necessary to protect them.*

EN Policy 4 Erosion Control. *Minimize soil disturbance and surface runoff in the Stream Protection Zones. Pursuant to the City's grading ordinance, work in and adjacent to the zones shall be conducted during the dry season only, at times when the Community Development Department determines that surface runoff will be minimal or containable.*

EN Policy 5 Habitat Restoration. *Restore damaged portions of riparian areas to their natural state, wherever feasible.*

EN Policy 7 Water Quality. *Encourage protection of water resources from pollution and sedimentation, and preserve their environmental and recreation values. count the project's size and cumulative impacts.*

EN Policy 8 Environmentally Sound Flood Control Measures. *Encourage flood control measures that retain the natural features and conditions of watercourses to the maximum feasible extent.*

EN Objective 2- Preserve, protect, and enhance wetlands.

EN Policy 9 Determination of Wetlands. *Recognize the U.S. Army Corps of Engineers (ACE) as the designated permitting agency that regulates wetlands. In regulating wetland activities, the ACE consults with other agencies and organizations including but not limited to U.S. Fish and Wildlife and State Department of Fish and Game.*

EN Policy 10 Wetlands Ecology. *Preserve and enhance wetlands ecology.*

EN Objective 3- Preserve, protect and enhance historic bayland areas.

EN Policy 12 Bayland Area Protection. *Regulate development in the Bayland Overlay Zone so that it does not encroach into wetlands or sensitive wildlife habitats, provided that this regulation does not prevent all use of a property. Discourage human activity that damages fisheries, or habitat for birds, fish or other wildlife.*

EN Objective 4 - Preserve and protect native plant and animal species and their habitat.

EN Policy 18 Species Diversity and Habitat. *Protect biological resources that are necessary to maintain a diversity of plant and animal species.*

EN Policy 19 Special Status Species. *Cooperate with State and Federal Agencies to ensure that development does not substantially adversely affect special status species appearing on the State or Federal list for any rare, endangered, or threatened species. The environmental documentation will screen for the Federal Candidate Species, plants listed on lists 1A, 1B, or 2 of the California Native Plant Society (CNPS), inventory of rare and endangered vascular plants of California and animals designated by CDFG as species of special concern or their current equivalent.*

CHAPTER V- Safety and Noise

SF Objective 3- Reduce flood hazards.

SF Policy 6 Cooperation with Marin County. *Continue to work with the Marin County Public Works Department to minimize negative impacts of storm runoff.*

SF Policy 8 Reducing Flood Hazards. *Reduce flood risk by maintaining effective flood drainage systems and regulating construction.*

SF Policy 9 Storm Drainage System. *Maintain unobstructed water flow in the storm drainage system.*

***Consistent*:** The proposed project is consistent with City of Novato General Plan policies listed above, since the primary objective of the RMA project is to reduce the potential risk and hazards associated with flooding and to maintain unobstructed flow in the storm drainage systems. During all RMA activities Avoidance and Minimization Measures and BMPs will be implemented to protect and enhance the streams and wetlands within the project area and native habitat found within these systems. Therefore the RMA program is consistent with the Policies EN 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 18, and 19 and SF 6, 8 and 9.

LAND USE AND PLANNING Section 1- (*continued...*)

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Affect agricultural resources, operations, or contracts (e.g. impacts to soils or farmlands, impacts from incompatible land uses, or conflicts with Williamson Act contracts)? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not change any agricultural resources, operation or contracts; therefore this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
d) Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not divide or affect the physical arrangement of the established communities; therefore this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
e) Result in substantial alteration of the character or functioning of the community, or present or planned use of an area? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not alter the character or function of the community and will actually be a benefit to the community by reducing the potential frequency of flooding; therefore, the project will result in less-than-significant impacts.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
f) Substantially increase the demand for neighborhood or regional parks or other recreational facilities, or affect existing recreational opportunities? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not increase demand for parks or other facilities, therefore this is a less-than-significant impact.

2. **POPULATION AND HOUSING.** ***Would the proposal:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Increase density that would exceed official population projections for the planning area within which the project site is located as set forth in the Countywide Plan and/or community plan? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not have an effect on population nor density of housing; therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or extension of major infrastructure)? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not have an effect on growth of an area either directly or indirectly; therefore the project will result in less-than-significant impacts.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Displace existing housing, especially affordable housing? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not displace existing housing of any kind; therefore, the project will result in a less-than-significant impact.

3. GEOPHYSICAL. ***Would the proposal result in or expose people to potential impacts involving:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Location in an area of geologic hazards, including but not necessarily limited to: 1) active or potentially active fault zones; 2) landslides or mudslides; 3) slope instability or ground failure; 4) subsidence; 5) expansive soils; 6) liquefaction; 7) tsunami ; or 8) similar hazards? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

This is a routine flood control maintenance project, which will not result in the building of any structures, not increase the vulnerability of other structures to geologic hazards, nor diminish stability of structures within the project area. Rather, the maintenance activities will add to the protection of the public and public infrastructure from potential geologic hazards by increasing channel function and removing debris from culverts and around flood control infrastructure such as trash racks and pump stations. Therefore the project will result in less-than-significant impacts.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Substantial erosion of soils due to wind or water forces and attendant siltation from excavation, grading, or fill? (source #(s): 3)	[ ]	[X]	[ ]	[ ]

This is a flood control maintenance project with primary objectives to remove vegetation, debris and accumulated sediment to maintain channel function and facilitate unobstructed flow around public infrastructure including bridges, storm drains, trash racks, and pump stations. Another aspect of the project is to prevent bank erosion and sedimentation into adjacent creek channels. The only sediment that will be excavated is below water line in creeks, channels sediment basins and drainage ditches; there will be no excavating or grading of adjacent channel banks, and no permanent fill is involved in the project unless it is related to a bio-engineered streambank stabilization project. Each activity includes prescribed Best Management Practices (BMPs), which are mandated to be employed during and after project implementation. Erosion control BMPs are implemented to keep soil from leaving the work sites. During work activities there may be a temporary increase in turbidity in drainages as sediment is disturbed from the dredging process and potential water quality impacts could have a negative effect

upon aquatic life. Avoidance and minimization measures to protect threatened and endangered species and sensitive habitats are discussed in Section V. 7 (a). Implementation of the following mitigation measures are incorporated into the project description and will decrease the impacts of erosion and sedimentation to a less than significant level.

MITIGATION MEASURES

V.3 (b)-1. The District shall designate an Environmental Compliance Coordinator (ECC) to oversee the implementation of the RMA in the field. Before commencement of a maintenance activity, the ECC shall review Site Fact Sheets for specific information on the type, location and extent of the activity and associated areas of disturbance and determine the Avoidance and Minimization Measures and Best Management Practices (BMPs) to implement prior to the maintenance activity. The ECC shall distribute the Site Fact Sheet to the Maintenance Supervisor five days before beginning the maintenance activity.

V.3 (b)-2. Erosion control BMPs shall be incorporated into each project to minimize the discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. Erosion control measures shall be monitored during and after storm events and modifications shall be made, if needed.

V.3 (b)-3. If a maintenance activity may cause the introduction of sediments into the stream, no phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start up of any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the ECC shall inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

V.3 (b)-4. DPW shall construct the project in a manner that reduces turbidity and protects water quality, resident fish and other aquatic species. To prevent streambed erosion from the use of temporary cofferdams, pipes and pumps used to de-water the creek channel, diversion pipe outlets would be placed on hard surfaces or outfall protection in the form of rock or similar material would be installed. These temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after project completion and the creeks shall be restored to their natural condition.

V.3 (b)-5. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material that may be washed into waters of the State shall be removed from the work area and transported to a legal upland spoils disposal site.

MITIGATION MONITORING MEASURES

V.3(b)-1-5. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

c) **Substantial changes in topography from excavation, grading or fill, including but not necessarily limited to: 1) ground surface relief features; 2) geologic substructures or unstable soil conditions; and 3) unique geologic or physical features?** (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

A long-term objective of this maintenance project is to restore natural channel formation and to decrease the potential risk and frequency of flooding. A localized change in stream channel and sediment basin topography will occur through the removal of sediment within the creek channels and drainages. It shall be the minimum amount needed to restore natural channel function and facilitate unobstructed flow conditions. Given the nature of the project, the changes in channel topography are desired outcomes. Given that the sediment to be removed is caused by deposition of eroded sediment from the upper watershed into the lower flood control drainages, impacts to these channels from excavation should be positive in nature. Consequently, the project will result in less-than-significant impacts.

4. **WATER.** ***Would the proposal result in:***

a) **Substantial changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?** (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Drainage patterns and rate of surface run-off into drainages within the project area from the upper watersheds and adjacent neighborhoods will remain unaltered. The removal of sediment and obstructing vegetation from these channels will increase the channel's ability to carry surface run-off during high flood flows and improve connectivity between downstream and upstream habitats. If the channels have greater functional ability after maintenance has been performed, the potential risk of flooding of adjacent roads and property will be reduced. Consequently, the project will result in less-than-significant impacts.

b) **Exposure of people or property to water related hazards, including, but not necessarily limited to: 1) flooding; 2) debris deposition; or 3) similar hazards ?** (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

This is a flood control project which will decrease potential for flood hazards caused by vegetation or debris deposition around culverts, trash racks, pump stations, and tide gates during high flows. By removing vegetation and sediment from the channels, ditches and sediment basins identified within the project area, the channels will be altered to improve natural channel function and decrease the threat of potential flooding of adjacent roads and property. The project will have an overall beneficial effect on preventing potential flood hazards and debris deposition; consequently the project will result in less-than-significant impacts.

c) **Discharge of pollutants into surface or ground waters or other alteration of surface or ground water quality (e.g. temperature, dissolved oxygen or turbidity)?** (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[X]	[ ]	[ ]

This is a routine flood control maintenance project with the primary objective to remove vegetation and accumulated sediment to maintain channel function and unobstructed flow around structures including bridges, storm drain outlets, and pump stations, and to maintain stable stream banks where necessary. The only sediment that will be excavated is below water line in creeks, channels and drainage ditches; there will be no excavating or grading of adjacent channel banks, and no permanent fill is involved in the project. Each activity includes prescribed Best Management Practices (BMPs), which are mandated to be employed during and after project implementation. The BMPs are designed to keep soil from leaving the work sites (erosion control BMPs) and to repair collapsing stream banks which often contribute to siltation of streams (bio-engineered stream bank repair BMPs). During implementation there may be a temporary increase in turbidity as sediment is disturbed by the dredging process. Potential water quality impacts could have a negative effect upon water quality and aquatic life. Potential impacts to threatened and endangered species that are present within or near the project site area are discussed in Section V.7(a). Implementation of the following mitigation measures will decrease the risk of impacts of erosion or siltation to water quality and aquatic resources and will reduce these impacts to less than significant.

MITIGATION MEASURES

V.4(c)-1. The District shall implement maintenance activities in a manner that reduces turbidity and protects water quality, resident fish and other aquatic species. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area and transported to a legal upland spoils disposal site.

V.4(c)-2. Appropriate BMPs shall be incorporated into each project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. BMPs to be implemented for each type of activity are referenced in the program documents and prescribed in the Project Fact Sheets for each site. Erosion control measures shall be monitored during and after storm events and modifications made, if needed. BMPS to be implemented are taken from the the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and the FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance.

V.4(c)-3. To prevent streambed erosion from the use of cofferdams, pipes and pumps used to de-water the creek, diversion pipe outlets shall be placed on hard surfaces or temporary outfall dissipation structures shall be installed (i.e. rock piles). Temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after project completion and the creeks shall be restored to their natural condition.

V.4(c)-4. No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start up of any phase of the project that may result in sediment run-off to the stream. If rainfall is predicted, erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the Environmental Compliance Coordinator shall

inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

MITIGATION MONITORING MEASURES

V.4(c)-1-6. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

d) Substantial change in the amount of surface water in any water body or ground water either through direct additions or withdrawals, or through intersection of an aquifer by cuts or excavations? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[X]	[ ]	[ ]

A select set of sites within the project will need to be temporarily dewatered for equipment access for sediment removal and bank stabilization aspects of the project and to protect special status species such as steelhead trout. Creek flows will be diverted by the construction of temporary cofferdams around the active construction site and water will be transported from upstream to downstream reaches via pumps and pipes/hoses. The cofferdams will be constructed with native materials, including sand bags, gravel bags or equivalent materials and be sealed and secured with plastic sheeting and anchored in place. There will be temporary impacts on water resources within these creek channels during the dewatering process. This impact will be short-term and localized but has the potential to adversely affect aquatic resources in the project area. Threatened and endangered species that are present or near the project site are discussed in Section V.7.(a) and applicable mitigations are proposed to protect these species during dewatering. Implementation of the following best management practices will decrease the risk of impacts to water resources resulting from the dewatering process and reduce these impacts to less than significant.

MITIGATION MEASURES

V.4(d)-1. The District shall construct the projects in a manner that protects fish and other aquatic resources and avoids loss of their habitat. A biologist shall oversee project work and implement any necessary conservation measures to protect these species, including pre-construction surveys and rescue and relocation to suitable upstream or downstream habitat.

V.4(d)-2. Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic. Intakes and outlets should be designed to minimize turbidity and the potential to wash contaminants into the stream. If a work site is to be temporarily dewatered by pumping, intakes should be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997). A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length. Once the project work is complete, water should be slowly released back into the work area to prevent erosion and decrease turbidity. The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under

this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration. All cofferdams, pumps, pipes, sheet plastic, silt fences or other non-native materials shall be removed from the stream upon project completion.

V.4(d)-3. Sufficient water shall at all times be allowed to pass downstream to maintain aquatic life below the diversion dam.

V.4(d)-4. For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials shall be removed from the stream following completion of the activity.

MITIGATION MONITORING MEASURES

V.4(d)-1-4. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

e) Substantial changes in the flow of surface or ground waters, including, but not necessarily limited to: 1) currents; 2) rate of flow; or 3) the course or direction of water movements? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The natural direction and rate of flow of groundwater will remain unchanged. The natural direction of flow of the creeks and channels will not change, but the rates of surface flow in some areas may increase with the decreased coefficient of friction resulting from the removal of sediment. As the channel function is increased, there may be a decrease in flood flows coming from the creeks and channels onto adjacent roads and properties, which is the objective of the project. Therefore, this is a less-than-significant impact.

f) Substantial reduction in the amount of water otherwise available for public water supplies? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not reduce the amount of water supply available to the public; therefore, this is a less-than-significant impact.

5. AIR QUALITY. *Would the proposal:*

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Generate substantial air emissions that could violate official air quality standards or contribute substantially to an existing or projected air quality violation? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the maintenance project. Since the work will occur out in the open air and over a short duration in each project area (1-7 days, depending on project site), the impact on air quality will be less-than-significant.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Expose sensitive receptors to pollutants, such as noxious fumes or fugitive dust? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the maintenance project. Since the work will occur out in the open air and over a short duration in each project area (1-7 days, depending on project site), the impact to sensitive receptors will be less-than-significant. The impact from dust will be minimal during sediment removal since the work is being done in the wet environment with very little volatile dust, therefore the impact to sensitive receptors will be less-than-significant.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Alter air movement, moisture, or temperature, or cause any change in climate? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

Planting of streamside native vegetation occurs as part of the STRAW Program, serving to decrease stream temperatures, increase carbon sequestration and reduce the impacts of global climate change, therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
d) Create objectionable odors? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

The only odors that will be produced will come from the exhaust fumes from the heavy equipment used for the project and potentially smell coming from anaerobic soil conditions in a super saturated environment. The work will occur out in the open air and over a short duration (1-7 days, depending on project site), therefore the impact from objectionable odors will be less-than-significant.

6. **TRANSPORTATION/CIRCULATION.** ***Would the proposal result in:***

		Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a)	**Substantial increase in vehicle trips or traffic congestion such that existing levels of service on affected roadways will deteriorate below acceptable County standards?** (source #(s): 3)	[ ]	[ ]	[X]	[ ]

The project will deploy vehicles and equipment on a daily basis to the various project sites, where it will remain until the project is completed each day. No substantial increase in vehicular traffic or congestion will occur because of the project. The level of service on affected roadways will not drop below acceptable County standards. These impacts will be minor and are commensurate with currently-occurring traffic impacts associated with routine road maintenance activities along these roads in Marin County. Therefore, this is a less-than-significant impact.

		Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b)	**Traffic hazards related to: 1) safety from design features (e.g. sharp curves or dangerous intersections); 2) barriers to pedestrians or bicyclists; or 3) incompatible uses (e.g. farm equipment)? ((source #(s): 3)**	[ ]	[X]	[ ]	[ ]

Project implementation will not result in dangerous design features or incompatible uses. Temporary staging of equipment along the road right-of-way could result in the temporary re-direction of vehicle, bicycle and pedestrian traffic. The proposed maintenance project is along County of Marin or local municipality maintained roads and road crews and contractors are experienced at conducting procedures to avoid road traffic hazards. Implementation of the following mitigation measure will decrease the risk of impacts to traffic hazards and reduce these impacts to less than significant.

MITIGATION MEASURES

V.6 (b)-1. The County maintenance crews and any Contractors on the project shall clearly mark alternative routes with traffic control signs during project implementation to ensure public safety.

MITIGATION MONITORING MEASURES

V.6 (b)-1. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

		Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c)	**Inadequate emergency access or access to nearby uses?** (source #(s): 3)	[ ]	[ ]	[X]	[ ]

Alternative routes shall be clearly marked with County of Marin traffic control signs or communicated on site by County Roads maintenance crews. Emergency vehicles would be given special consideration to provide

unimpeded and continual access to roadways during the maintenance period. Therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
d) Insufficient parking capacity on-site or off-site? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

Because equipment will sometimes be staged from the road right-of-way, there could be a temporary loss of pull-out areas used for parking at some sites along project related roads, where staging of County vehicles and equipment could result in the temporary use of part of these pull-out areas. Due to the temporary maintenance nature of the project, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
e) Substantial impacts upon existing transportation systems, including rail, waterborne or air traffic systems? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

Due to the temporary maintenance nature of the project, no substantial impacts upon existing transportation systems will occur on or around the project sites. Minor road diversions may be required during project activities, with alternative routes clearly marked with County of Marin traffic control signs or communicated on site by County Roads maintenance crews. Therefore, this is a less-than-significant impact.

7. **BIOLOGICAL RESOURCES.** ***Would the proposal result in:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats including, but not necessarily limited to: 1) plants; 2) fish; 3) insects; 4) animals; and 5) birds listed as special-status species by State or Federal Resource Agencies? (source #(s): 3, 4)	[ ]	[X]	[ ]	[ ]

In order to assess and mitigate for potential impacts to special status species and their habitats, a biologic assessment was conducted which looked at potential impacts of all routine maintenance activities on special status species and their habitats; (Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works, California. July 2011). Those species with a moderate to high potential to occur, or those species prominent in the regulatory environment are discussed in detail in the Biological Assessment and actions to avoid impacts to these species and their habitats are summarized in this section.

Based on quad searches and special status species listings from federal and state agencies searches, 80 special status animal species have been identified as having some potential of occurring within the project sites. Of these, only 16 species, based on literature and database reviews and familiarity with local fauna, are considered likely to occur within the project sites and eight of these are listed as threatened or endangered including:

- Central California Coast coho salmon (*Oncorhynchus kisutch*)
- Central California Coast steelhead trout (*Oncorhynchus mykiss irideus*)
- California red-legged frog (*Rana draytonii*)
- Northwestern pond turtle *(Clemmys (Actinemys) marmorata marmorata)*
- California clapper rail (*Rallus longirostris obsoletus*)
- California black rail (*Laterallus jamaicensis coturniculus*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Salt marsh harvest mouse (*Reithrodontomys raviventris*)

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites. Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed as threatened or endangered; all are species of concern.

- Point Reyes bird's-beak (*Cordylanthus maritimus ssp. palustris*)
- Pale Yellow/Hayfield tarplant *(Hemizonia congesta ssp. congesta)*
- Marsh microseris *(Microseris paludosa)*
- Marin knotweed *(Polygonum marinense)*

The RMA program is complex; at any one time during the work season, different work activities may be occurring at several sites, with several different contractors. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality. Pre-construction surveys to locate special status species will be conducted before maintenance activities commence as prescribed and work at each site will be scheduled around relevant work windows where possible to avoid impacts (Table 1; page 7). Work at a site may be re-scheduled based on survey finding if necessary. A suite of General and Activity-Specific Conditions apply to activities implemented as part of the RMA program as well as species-specific Avoidance and Minimization Measures (AMMs).

Best Management Practices (BMPs) have been prescribed for each project site, depending on activity type, site constraints, and species presumed to be present. BMPs to be implemented at each site are referenced from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and FEMA.

General and Activity-Specific Conditions, AMMs and BMPs are incorporated into the RMA project description and included in the individual Project Fact Sheets for each site. The job of the Environmental Compliance Coordinator is to ensure that all measures are employed as prescribed in the field prior to, during and after implementation. The General and Activity-Specific Conditions, AMMs and species-specific AMMs are described in detail below and included in the Project Fact Sheets developed for each site.

MITIGATIONS

The following mitigation measures are proposed to avoid and minimize the reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats and would decrease the risk of impacts to a level of less than significant.

GENERAL CONDITIONS

V.7(a)-1. Designation of Environmental Compliance Coordinator- An Environmental Compliance Coordinator (ECC) shall be designated by the County of Marin Flood Control District. The ECC shall have an understanding of biological resources, missions of regulatory agencies, regulations as they may affect listed species, and the nature of the maintenance activities. In the planning stage, before commencement of a maintenance activity, the ECC shall review project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he shall determine appropriate pre-construction surveys that may be required, depending on the species involved and the type of activity planned for that project site. The ECC shall ensure that the project crews adhere to General and Activity-Specific Conditions and Avoidance and Minimization Measures prescribed for each site and type of activity.

V.7(a)-2. Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

V.7(a)-3. Contractor Crew Training- The ECC shall ensure that before work starts, all on-site maintenance activity personnel and contractors receive instruction regarding the presence and description of listed species at each project site and the details of appropriate avoidance and minimization measures.

V.7(a)-4. Site Preparation/Wildlife Reconnaissance - The ECC shall walk the site each day before maintenance activities commence to locate wildlife; if any special status wildlife species are noted, work shall not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

V.7(a)-5. Monitoring and Reporting Program- The ECC shall implement a monitoring and reporting program that shall include, but not be limited to: preparing each year's project list, scheduling pre-construction surveys, overseeing project activity during maintenance, preparing photo documentation, and evaluating post-maintenance restoration/revegetation, if necessary. Reporting regarding project impacts to California red-legged frogs shall be performed in accordance with the terms and conditions issued by the USFWS. Report of sightings will be documented using the CNDDB protocols published by the Department of Fish and Game. .

V.7(a)-6. Work Windows - To avoid impacts to special status species, the maintenance activities carried out shall typically occur during the summer low flow season. The general work window for RMA activities is from April 15th to October 15th, depending on weather. As a rule, work at each site will be scheduled around relevant work windows to avoid impacts. In instances where work needs to be scheduled outside of an established work window for a particular species in a specific location, species-specific pre-construction surveys will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of Avoidance and Minimization Measures before proceeding. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality. The work window for streamside restoration by the STRAW Program is from October-March when schools are in session.

SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES (AMMs)

Avoidance and Minimization Measures for Fish

FISH-1: Salmonids

Several project sites within the RMA watersheds have the potential for presence of steelhead trout. If steelhead are known to be absent from the project site based on CEMAR/DFG surveys or there are long-standing natural or artificial downstream barriers sufficient to prevent upstream migration, then avoidance has been accomplished and no further actions are necessary. Presence or absence of steelhead trout in each project area is documented in the project fact sheets which are used on a daily basis by the Environmental Compliance Coordinator to guide the implementation of AMMs and BMPs in the field before, during and after completion of maintenance activities.

If steelhead trout are determined or presumed to be present at the project site, then the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-7. Work Window: All work in and around salmonid streams is restricted to the period of June 15th to October 15th in any given year. This is to take advantage of low stream flow and avoid the spawning and egg/alevin incubation period which occurs in the late fall and the outmigration period in the spring. Work outside of the channel is not subject to this modified work period.

V.7(a)-8. No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified biologist.

V.7(a)-9. To minimize turbidity and stress to salmonid species, personnel shall avoid walking through stream pools and thalwegs, and shall instead walk across riffles or outside of the stream bed to access a project site.

V.7(a)-10. To minimize disturbance during sediment removal activities, if there is flow or seepage in a work site, a reach of creek may have to be de-watered. Before construction of the de-watering system, a qualified biologist shall conduct fish relocation activities, and immediately release captured fish to a suitable habitat near the project site.

V.7(a)-11. Screens shall be placed on all pumps used for dewatering the work site in accordance with NOAA Fisheries' Fish Screening Criteria for Anadromous Salmonids (NMFS, 1997).

V.7(a)-12. If used, coffer dams shall be constructed upstream of the work site within the stream banks, and shall be constructed with clean river gravel or sand bags and covered with sheet plastic. Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into streams.

V.7(a)-13. Pump discharge must be directed into a settling basin to allow silt removal. Once the project work is complete, water shall be slowly released back into the creek to prevent erosion and limit turbidity.

V.7(a)-14. All habitat improvements on salmon and steelhead streams shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (CDFG 2010d).

Avoidance and Minimization Measures for Reptiles

REP-1: Northwestern pond turtle

Several sites may contain suitable habitat for northwestern pond turtle, and they have been known to occur at sites 1-ASJ-1, 1-LYC, and 1-WAR-2.

V.7(a)-15. Work window: There is no work windows for this species; surveys may be required if maintenance activities will occur in potential pond turtle habitat. Prior to and during maintenance work, the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-16. Pre-construction surveys for northwestern pond turtles shall be conducted at these sites by a qualified biologist in accordance with USFWS protocols within 72 hours of the start of maintenance. The creek shall be surveyed for presence of turtles and the creek banks surveyed for presence of burrows; all locations of observed turtles and burrows shall be noted.

V.7(a)-17. Each day, before maintenance activities begin, the Environmental Compliance Coordinator (EEC) shall make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, the ECC shall assess the likelihood of project impacts to these species and coordinate findings with the USFWS and CDFG to ensure that appropriate protective measures are applied including hand removal or installation of fencing to avoid the area completely. At any time during maintenance activities, if a northwestern pond turtle is observed by the ECC, maintenance crew, or other knowledgeable persons, maintenance activities shall stop and the appropriate protective measures shall be applied including hand removal or installation of fencing to avoid the area completely.

V.7(a)-18. All staging areas for all heavy equipment, storage of materials, and any maintenance/fueling of heavy equipment shall be clearly identified in order to minimize impacts to upland habitats outside the project site.

V.7(a)-19. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of northwestern pond turtles, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Avoidance and Minimization Measures for Birds

Following are avoidance and minimization measures for birds. Some of these relate directly to listed species with the potential to occur within one or more of the project sites (the rails, northern spotted owl); however, others relate more generally to a class of species, such as raptors and wading birds and land birds.

V.7(a)-20. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. Because the culverts in the proposed project sites are fairly small, there is minimal likelihood that they would provide suitable habitat for swallows. However, if any culverts show evidence of past or current swallow nesting, the ECC shall identify them and maintenance activities shall occur after August 31 or after all swallows have fledged to avoid impacts.

V.7(a)-21. If work in the riparian zone will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will

not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

BIRD-1: California Clapper Rail and California Black Rail

Several of the sites are within or immediately adjacent to suitable habitat for California clapper rail and California black rails (15-20 sites). The following avoidance and minimization measures apply to all sites within 250 feet of salt or brackish tidal marshland, which will also help to protect other marshland dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

V.7(a)-22. Work window: The work window for maintenance activities within rail habitat is the non-nesting season of September 1st through January 31st. If maintenance activities are scheduled to ocur within the nesting season (February 1st to August 31st) , the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-23. Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails.

V.7(a)-24. If maintenance activities are scheduled during the nesting season (February 1st to August 31st , a qualified biologist, in coordination with USFWS and/or CDFG, shall conduct a pre-construction survey within 5 days of the start of maintenance activities to check for nests and presence of the rails within the project sites. Additional surveys may be required including visual and/or call surveys to determine presence. A buffer zone of 250 feet from nests or occupied rail habitat shall be established and any activity within that buffer zone that has potential to disturb rails (i.e. high-decibel construction, pumping, use of heavy machinery, etc.) shall be rescheduled for later in the season once nesting has ended and the young have fledged (from September 1st through January 31st). If no nests are found but rails are present, the birds must be allowed to leave the area on their own before work can commence.

V.7(a)-25. When working within 250 feet of salt or brackish marshland, presence for either rail species shall be assumed; therefore, maintenance work in these areas shall be scheduled between September 1st and January 31st in any given year.

V.7(a)-26. Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If maintenance or dredging activity does intrude into tidal marsh habitat, a qualified biologist shall survey the area prior to beginning work in order to determine the presence/absence of rails.

BIRD-2: Northern Spotted Owl

Per Department of Fish and Game Protocol for Surveying Proposed Management Activities that May Affect Northern Spotted Owls (2010), project sites are defined as the project footprint plus a .25 mi. radius buffer around it. Centers of northern spotted owl activity are located on Old Mill Creek, Cascade Creek, Warner Canyon Creek, Bothin Creek, Larkspur Creek, and Ross Creek and several of these documented locations fall within the .25 mi. buffer around several of the work sites: (3-OMC; 3-CAS; 3-WAR; 9-BOTH; 9-LAR-2; and 9-ROS).

V.7(a)-27. Work window: To avoid impacts to breeding northern spotted owls, maintenance activities identified as having potential impact on northern spotted owls or their habitat shall follow a limited operating period (LOP) with no work scheduled during the breeding season of February 1st through July 15th. If a biological evaluation conducted by a qualified biologist determines that vegetation projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location, or where a biological evaluation determines that topographic features may shield nest sites, the LOP may be waived or the buffer distance modified.

BIRD-3: Raptors and wading birds

Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them shall be minimized.

V.7(a)-28. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start outside of the nesting season (July 31 – January 31), then avoidance has been achieved and work can proceed. If maintenance activities are scheduled outside of the work window during the nesting season (Feb 1st- July 31st) then the following AMMs shall be followed:

V.7(a)-29. The ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

V.7(a)-30. During nesting season, (February 1st - September 1st), the ECC shall walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

V.7(a)-31. At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. However, if work in the riparian zone will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

BIRD-4: Landbirds

Many of the project sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. These project sites include: 1-NOV-3, 3-ACMP-3, 3-NYH-2, 5-EAS-2, 9-CMC-4, and many more. Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would violate the federal Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game (CDFG) Code.

V.7(a)-32. Work window: Avoidance will be achieved if maintenance activities are scheduled between August 1st to January 31st to avoid the nesting season (February 1st - July 31st). If maintenance activities are scheduled outside of the work window, then the following Avoidance and Minimization Measures shall be implemented:

V.7(a)-33. The removal of any trees or shrubs shall occur after August 1st, once the nesting season is complete. If removal of trees or shrubs occurs between February 1st and July 31st, a nesting bird survey shall be performed by a qualified biologist within 14 days prior to the removal or disturbance of potential nesting trees or shrubs. All trees with active nests shall be flagged and a non-disturbance buffer zone shall be established around the nesting tree, or the site shall be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft for passerines and non-passerine land birds. Active nests shall be monitored by a qualified biologist to determine when the young have fledged and are feeding on their own before work is allowed to begin.

V.7(a)-34. In addition to surveying trees and shrubs for nesting birds, surveys shall be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within 14 days prior to the commencement of project related activities by a qualified biologist.

V.7(a)-35. The ECC shall be present at the commencement of maintenance-related activities to ensure that nesting birds and sensitive bird species have not inhabited the project site during the window following pre-construction surveys and commencement of maintenance activities. The ECC shall also survey all staging areas to ensure nesting and special status birds are not present.

V.7(a)-36. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of sensitive habitat and bird species, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Avoidance and Minimization Measures for Mammals

MAMM-1: Salt Marsh Harvest Mouse (SMHM)

Salt marsh harvest mouse is a federal and state listed endangered species although critical habitat has not been designated for this species. This species is found in saline emergent marsh vegetation with dense pickleweed. It is reported to occur within the project site in lower reaches of Novato Creek levees, Gallinas Creek South Fork, and Bothin Marsh sites. Approximately 15-20 sites are adjacent to suitable habitat for salt marsh harvest mouse; and about half of those sites include work where removal of pickleweed may impact salt marsh harvest mouse habitat. For these sites, the following AMMS should be followed:

V.7(a)-37. Work window: There are no seasonal work windows for this species since they breed year around,

V.7(a)-38 Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for SMHM. Generally, work should not be scheduled to occur between two hours before high tide and two hours after high tide.

V.7(a)-39. If maintenance activities are conducted in potential SMHM habitat, a qualified biologist shall conduct a pre-construction survey within 5 days of the start of maintenance activities to determine the presence/absence of SMHM within and adjacent to the work area. Surveys shall follow USFWS protocols. In addition, a biological monitor shall be present during maintenance-related activities within or adjacent to all suitable nesting habitat areas to ensure that salt marsh harvest mice are not present during operations.

V.7(a)-40. For sites where work includes removal of pickleweed, under the supervision of a qualified biologist and according to protocols established by Zedler (2001), vegetation shall be removed only with non-mechanized

hand tools; no motorized equipment shall be used. Vegetation removal may begin only when no mice are observed, and shall start at the edge farthest from the salt marsh and work its way towards the salt marsh. If a mouse of any species is observed within an area where pickleweed is being removed, work shall stop and DFG shall be notified. Unless otherwise approved by DFG, the mouse shall be allowed to leave on its own volition.

V.7(a)-41. If trenching takes place within 50 ft of pickleweed areas, exclusionary fencing shall be installed around worksites before excavation begins, according to DFG specifications on size and placement of fencing. An escape ramp shall be placed in any open trench at the end of the day to allow any entrapped animals to escape.

V.7(a)-42. When implementing maintenance activities in upland areas adjacent to salt or brackish marshland, vehicles shall be confined to existing roads where possible, Crews shall use matting, pontoon boards or other comparable methods whenever feasible to minimize impacts to the existing vegetation. The placement of mats shall be verified by a qualified biologist before their placement to minimize habitat impacts. Crews shall work exclusively from mat boards and boardwalks to minimize trampling of vegetation.

V.7(a)-43. A biological monitor shall be on-site during all work activities within potential SMHM habitat, and will have the authority to halt project activities in order to comply with these terms. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of the SMHM and its habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

MAMM-2: Roosting Bats

V.7(a)-44. Work window: The work window for activities at sites where bats are determined to be present is from September 1st through January 31st. Impacts can be avoided by scheduling work, especially removal of trees and/or dense growths of ivy, after the breeding season ends on September 1st of any given year.

V.7(a)-45. Some of the sites may be within or adjacent to suitable habitat for roosting bats. If work is conducted outside of the work window, pre-construction surveys for signs of roosting bats shall be conducted concurrent with those for land birds. If surveys occur during the daytime, the biologist shall look for presence of bat droppings at likely roost sites (under bridges and trees (in layers of bark, woodpecker holes, and hollow branches). The droppings are black and small, about 4 – 8 mm long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software. If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed.

V.7(a)-46. If bat guano was detected during the pre-construction survey, and removal of trees, shrubs, or dense ivy is scheduled to occur before September 1st, a qualified biologist shall conduct a roosting bat survey within 30 days prior to the removal or disturbance of potential nesting/roosting trees or shrubs. If bats are detected, work shall be re-scheduled for after the breeding season.

Avoidance and Minimization Measures for Plants

PLANT-1: Special Status Plants

Special-status plant species include those listed as Endangered, Threatened, Rare or those species proposed for listing by the USFWS (2001b), the CDFG (2010a,b) and the CNPS (2010). The CNPS listing is sanctioned by the

CDFG and serves essentially as their list of "candidate" plant species. CNPS List 1B and List 2 species are considered eligible for state listing as endangered or threatened under the CDFG Code. Such species should be fully considered during preparation of environmental documents subject to the California Environmental Quality Act (CEQA). CNPS List 3 and List 4 species are considered to be either plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS and CDFG recommend that these species be evaluated for consideration during the preparation of CEQA documents.

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites (Appendix A). Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed; all are species of concern. Based on a reconnaissance-level survey and habitat assessment, many of the 33 species with at least some potential to occur within the region can be ruled out from the work sites due to the lack of suitable habitat within the project corridor. Specialized habitats such as playas, coastal dunes, lower montane coniferous forest, vernal pools, coastal bluff scrub, coastal prairie, and serpentine-derived soils or outcrops are not present within the study area or work sites.

Although location data for several special-status plant species places them within the study corridor, the presence of some of these within the work sites remains highly unlikely. In many cases, the location data from CNDDB represent historic data from the time period before large-scale development. In other cases, the CNDDB data represent best guesses as to location, and while shown as covering the proposed project sites, the required habitat may not be present within the work sites.

The following four plant species are considered to have some potential to occur within one or more of the work sites, due to: 1) the presence of suitable habitat, 2) the plant was detected during the site reconnaissance, and/or 3) the species has been reported within the vicinity of the work sites.

1. ***Point Reyes bird's-beak (Cordylanthus maritimus ssp. Palustris;*** *STATUS. Point Reyes bird's beak is a federal species of special concern and is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE The CNDDB lists 42 occurrences of Point Reyes bird's beak in Marin County; the majority of these are on the western coast. Sites near CNDDB occurrences include: 3-BM, 3-MIL-3, 3-RYC-1, 3-SUT-1.*

2. ***Pale Yellow/Hayfield tarplant*** (Hemizonia congesta ssp. congesta) *STATUS. The pale yellow tarplant is not listed by the federal or state governments but is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE. The CNDDB lists a record in Ignacio near sites 1-ASJ-1, 1-ASJ-2, and 1-ASJ-3.*

3. ***Marsh microseris (Microseris paludosa)*** *STATUS. The marsh microseris is not listed by the federal or state governments but is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE. The CNDDB lists occurrences in the vicinity of sites: 3-CAS, 3-ACMP-3, and 9-LAR-2.*

4. Marin knotweed (*Polygonum marinense*) *STATUS. Marin knotweed is a federal species of special concern and is listed by the CNPS as 3 (needing taxonomic review). PROJECT SITE OCCURRENCE. The CNDDB contains record for Marin knotweed on Corte Madera Creek, just downstream of site 9-CMC-1 and at the creek mouth.*

The following mitigations developed for treatment of special status plants and their habitats shall be adhered to during project implementation; therefore impacts to these species will be less-than-significant:

V.7(a)-47. Work window: There are no work windows for the plant special status species; surveys may be required if species may be impacted.

V.7(a)-48. At sites where vegetation may be modified (such as mowing, clearing, or ground-breaking), and where special status plant species may potentially occur, a qualified biologist should conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

V.7(a)-49. If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000). Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

V.7(a)-50. If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

V.7(a)-51. For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDB documenting the species and location. The ECC shall ensure that the Project Foreman is aware of these site-specific conditions, and shall inspect the work site before, during, and after completion of the maintenance activities.

MITIGATION MONITORING MEASURES

V.7 (a)-1-51. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

b)	**Substantial change in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur at any time throughout the year? (source #(s): 3, 4)**	**Significant Impact** [ ]	**Potentially Significant Unless Mitigated** [X]	**Less Than Significant Impact** [ ]	**Not Applicable** [ ]

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.
As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

All construction activities for the project would be completed in a fashion that minimizes disturbance to existing riparian and aquatic habitat. The proposed removal of riparian vegetation is the absolute minimum necessary to provide access for maintenance equipment, restore the natural flow regime, provide flood protection, and minimize loss of riparian trees. Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program.

Avoidance and minimization measures prescribed for each activity at each site have been established and shall be implemented to ensure that animals inhabiting the project area. The following mitigation measures are proposed to avoid and minimize changes in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur on the project site and would decrease the risk of impacts to a level of less than significant.

MITIGATION MEASURES

V.7(b)-1. DPW shall minimize any riparian tree removal in order to preserve habitat quality. Removal of native riparian vegetation shall be limited to that necessary for equipment access and flood control (e.g., removing fallen trees in channels).

V.7 (b)-2. An Environmental Compliance Coordinator (ECC) shall be designated for all maintenance activities. The ECC shall have an understanding of biological resources, missions of regulatory agencies and regulations as they may affect listed species, and the nature of the maintenance activities. Before commencement of a maintenance activity, the ECC shall review the individual project fact sheets containing project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he shall determine appropriate measures to implement, based on the type of activity, and shall prescribe appropriate avoidance and minimization measures and general and activity-specific conditions and prohibitions.

V. 7 (b)-3. All prescribed General Conditions and Avoidance and Minimization Measures, as described above and documented in the Project Fact Sheets for each project site, shall be adhered to during pre-project planning, implementation and post-project clean-up.

V. 7 (b)-4. The ECC shall ensure that the Project Foreman is aware of any site-specific conditions and avoidance and minimization measure prescribed for the activity at each site, and shall inspect the work site before, during, and after completion of the maintenance activities.

MITIGATION MONITORING MEASURES

V.7(b)-1. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

c)	**Introduction of new species of plants or animals into an area, or improvements or alterations that would result in a barrier to the migration, dispersal or movement of animals?** (source #(s): 3, 4)	**Significant Impact** [ ]	**Potentially Significant Unless Mitigated** [X]	**Less Than Significant Impact** [ ]	**Not Applicable** [ ]

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary. Exotic plants are often introduced by seed banks contained in imported fill or mud that is caked onto construction equipment that moves from site to site. The District shall not bring any fill to project sites. Invasive plants can also be introduced by seeds contained in hydro-seed mixes or hay products. Therefore, sediment and erosion control measures shall avoid using these products and use only weed-free rice straw or other similar products for erosion control.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program.

The ability of wildlife to move through the landscape is important for migration (seasonal breeding and feeding), dispersal (new home ranges and long-term genetic exchange), and for daily movement within individual territories. Habitat fragmentation creates a greater number of habitat patches that are smaller in size than the original contiguous habitat. This, in turn, can hinder regional wildlife movements, put stress on local populations, and increase the probability of extinction for these populations compared to those associated with non-fragmented landscapes. Considering the impacts resulting in potential fragmentation of primary habitat types and loss of valuable dispersal corridors is important when assessing the biological impacts of a project. Because the activities proposed do not involve the permanent loss of wetland and/or riparian habitat within the work sites, they are not likely to affect wildlife movement corridors or contribute to habitat fragmentation. Given that the proposed work is maintenance-related, the project will likely only result in short-term temporal impacts (1-2 days) to movement for aquatic species dependent the subject habitats. Movement through these areas will be restored as soon as maintenance activities are completed.

Removal of excessive sediment should help to open the channel and enhance opportunities for resident and migratory fish and other aquatic species to move freely to suitable upstream and downstream habitats. Re-colonization of on-site native wetland vegetation communities to their previous condition will occur naturally. Implementation of the following mitigation measures would decrease the risk of impacts caused by the accidental introduction of new species of plants or animals into the project area to a level of less than significant.

MITIGATION MEASURES

V.7(c)-1. The District shall prevent the unintentional introduction of new species of plants or animals into the project area by a wash down of all equipment prior to transporting it to project sites in order to eliminate mud that may harbor exotic plant species and animals.

V.7(c)-2. The District shall not import fill to project sites.

V.7(c)-3. The District shall only use straw wattles that contain weed-free rice straw and shall not use hydro-seeding or seeded hay products.

V.7(c)-4. If kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

MITIGATION MONITORING MEASURES

V.7(c)-1-4. District staff shall verify that these Mitigation Measures have been properly implemented.

8. ENERGY AND NATURAL RESOURCES. *Would the proposal result in:*

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantial increase in demand for existing energy sources, or conflict with adopted policies or standards for energy use? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

Due to the maintenance nature of the project, no increase in demand for existing energy sources or standards for energy use will be affected. Therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Use of non-renewable resources in a wasteful and inefficient manner? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and implementation will require very little use of non-renewable natural resources, however some fuel will be spent on equipment usage, although the impact of this usage would create a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Loss of significant mineral resource sites designated in the Countywide Plan from premature development or other land uses which are incompatible with mineral extraction? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

No significant mineral resources are found on the project site, therefore, this is a less-than-significant impact.

9. HAZARDS. *Would the proposal involve:*

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) A risk of accidental explosion or release of hazardous substances including, but not necessarily limited to: 1) oil, pesticides; 2) chemicals; or 3) radiation)? (source #(s): 1, 3)	[ ]	[ ]	[X]	[ ]

Best Management Practices, including those covering Chemical Use shall be employed to prevent or reduce the risk from, or impacts from, the accidental discharge of chemicals from vehicles operating at the project sites. Therefore, this is a less-than-significant impact.

b) **Possible interference with an emergency response plan or emergency evacuation plan? (source #(s): 3, 4).**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The sediment removal activities shall not interfere with an emergency response or evacuation plan. In the case of an emergency, all heavy equipment shall immediately be removed from the roadway in order to allow vehicles to enter the area. Heavy equipment deployed at the project site can be removed in a matter of a few minutes during an emergency or evacuation. Therefore, this is a less-than-significant impact.

c) **The creation of any health hazard or potential health hazard? (source #(s): 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The implementation of routine maintenance activities will not create any potential health hazards; therefore, this is a less-than-significant impact.

d) **Exposure of people to existing sources of potential health hazards? (source #(s): 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The removal of sediment from the creeks and channels and replanting streamsides with native vegetation will not expose people to existing sources of health hazards; therefore, this is a less-than-significant impact.

e) **Increased fire hazard in areas with flammable brush, grass, or trees? (source #(s): 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

One of the primary goals of vegetation management is to reduce fire fuels lading and the potential for fire hazards. Fire fuel reduction is achieved by mowing on tops of banks and levees, removal of fallen trees, removal of standing dead trees, and thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas. Therefore the proposed project will have a positive effect on reducing fire hazards, therefore this is a less-than-significant impact.

10. NOISE. ***Would the proposal result in:***

a) **Substantial increases in existing ambient noise levels?** (source #(s): 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

There will be a temporary increase in ambient noise levels during normal working hours if heavy equipment (e.g. backhoe or excavator) is used to remove sediment from the creeks, channels and drainage ditches. The duration of the impacts will be short, typically a few days, depending on the site, and the noise level will be comparable to noise generated during typical routine maintenance activities conducted by public works or flood control districts. The noise impact be limited to typical day time construction hours between 7 a.m. and 5 p.m., therefore, this is a less-than-significant impact.

b) **Exposure of people to significant noise levels, or conflicts with adopted noise policies or standards?** (source #(s): 1, 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

There will be an increase of noise levels during implementation of maintenance activities but only for a temporary time as with any maintenance project. Any increase in noise levels from construction equipment on private property will occur where landowners have given prior permission for maintenance activities to occur. The increase in maintenance related noise levels would only occur during weekdays, from approximately 8:00 a.m. to 4:00 p.m. This is consistent with the County's adopted noise policy from 7am-6pm, Mon.-Fri. and not on holidays. Therefore, this is a less-than-significant impact.

11. **PUBLIC SERVICES.** ***Would the proposal have an effect upon, or result in a need for new or altered government service in any of the following areas:***

a) **Fire protection?** (source #(s): 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The fire fuels reduction aspect of the project is designed to reduce the risk of fire along grassy levees and upper stream banks. Mowing is scheduled to be completed before the Fourth of July holiday as an added measure to prevent fires related to holiday fireworks. The project does not include a demand for additional fire protection services; therefore, this is a less-than-significant impact.

b) **Police protection?** (source #(s) 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The sediment removal maintenance project will not have an effect on police protection; therefore, this is a less-than-significant impact.

c) **Schools?** (source #(s): 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

Project implementation will not result in dangerous design features or incompatible uses with schools; therefore this be a less than significant impact.

d) **Maintenance of public facilities, including roads?** (source #(s): 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

A primary goal of the proposed RMA program is to perform maintenance operations on County flood control channels and related infrastructure, including levees, tide gates, pump stations and trash racks. The objective of maintaining this infrastructure is to reduce the risk of potential flooding and consequential adverse impacts on other infrastructure including adjacent buildings and roads. The project itself will provide additional government services to protect people and infrastructure from flooding and will benefit the maintenance of public facilities; therefore this is a less-than-significant impact.

e) **Other governmental services?** (source #(s): 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The RMA program does not create an increased demand for additional services but rather the project will increase governmental services by providing greater flood control protection through routine maintenance of flood control channels and related infrastructure, including levees, tide gates, pump stations and trash racks. Regular routine maintenance of facilities will reduce the risk of potential flooding and consequential adverse impacts on other infrastructure including adjacent buildings and roads. This in turn will decrease the need for emergency government services during high storm flows; therefore, this is a less-than-significant impact.

12. **UTILITIES AND SERVICE SYSTEMS.** ***Would the proposal result in a need for new systems, or substantial alterations to the following utilities:***

a) **Power or natural gas?** (source # (s): 1, 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

No alterations to power or natural gas will be required for the maintenance project; therefore, this is a less-than-significant impact.

b) **Communications systems?** (source # (s): 1, 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

No alterations to communications systems will be required by the maintenance project; therefore, this is a less-than-significant impact.

c) **Local or regional water treatment or distribution facilities?** (source # (s): 1, 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

No alterations to water treatment or distribution will be required by the maintenance project; therefore, this is a less-than-significant impact.

d) **Sewer or septic tanks?** (source # (s): 1, 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

No alterations to sewer or septic tanks will be required by the maintenance project, therefore, this is a less-than-significant impact.

e) **Storm water drainage?** (source # (s): 1, 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The flood control routine maintenance activities proposed in this project will have a positive affect on the function of flood control channels and streams to carry and conduct stormwater run-off. Limited removal of obstructing vegetation and excavation of sediment deposits will increase channel function and decrease the potential risk of flooding. The regular maintenance of tide gates and trash racks will increase the ability of storm flows to travel through stream channels. The project's objective is to maintain channel function, especially during peak storm events; therefore, this is a less-than-significant impact.

f) **Solid waste disposal?** (source # (s): 1, 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

No alterations to solid waste disposal will be required by the maintenance project; therefore, this is a less-than-significant impact.

13. AESTHETICS/VISUAL RESOURCES. ***Would the proposal:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantially reduce, obstruct, or degrade a scenic vista open to the public or scenic highway, or conflict with adopted aesthetic or visual policies or standards? (source # (s): 1, 3)	[ ]	[ ]	[X]	[ ]

No alterations to scenic vistas will result from the maintenance project. The project would minimize potential impacts to sensitive habitats at the project sites and would be designed to blend into the surrounding natural environment to the greatest extent feasible. Some trimming of riparian trees will occur, but the project would not change the riparian character of the project sites. The projects would not obstruct or alter the visual character of the project sites or result in visual impacts to public or scenic views and vistas from adjacent roadways. Because this is a flood control maintenance project that does not result in any permanent structures and is temporary in nature, project activities would not adversely affect views, light or privacy of private properties. Therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Have a demonstrable negative aesthetic effect by causing a substantial alteration of the existing visual resources including, but not necessarily limited to: 1) an abrupt transition in land use; 2) disharmony with adjacent uses because of height, bulk or massing of structures; or 3) cast of a substantial amount of light, glare, or shadow? **(source #(s):** 1, 3)	[ ]	[ ]	[X]	[ ]

No alterations to visual resources will result from the project. The project would minimize potential impacts to sensitive habitats at the project site and would be designed to blend into the surrounding natural environment to the greatest extent feasible. Some removal and trimming of riparian trees will occur, but the project would not change the riparian character of the sites. The projects would not obstruct or alter the visual character of the sites or result in visual impacts to public or scenic views and vistas from adjacent roadways. Because this is a flood control maintenance program that does not result in any permanent structures, project activities would not adversely affect views, light or privacy of private properties. Therefore, this is a less-than-significant impact.

14. CULTURAL RESOURCES. *Would the proposal*:

a) **Disturb paleontological, archaeological, or historical sites, objects, or structures? (source #(s): 1, 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[X]	[ ]	[ ]

The proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and many sites where sediment is to be removed have previously been dredged multiple times in the same locations. No historic structures will be impacted by the proposed routine maintenance project since no work is planned to be completed on any structures other than maintenance facilities including weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. Although no human remains or archaeological resources are known to occur within the proposed project sites or in the immediate vicinity, it is possible that there may be undiscovered archaeological resources buried at the sites due to their location in a high sensitive area. Such resources could be discovered during proposed sediment removal on the site, making this a potentially significant impact.

The following mitigation measures would reduce potential impacts to less than significant by detailing a course of action in the unlikely event that archaeological resources or human remains are encountered during construction activities.

MITIGATION MEASURES

V.14(a)-1. In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparations or construction activities on any part of the project sites, all work at the vicinity of the discovery site shall be halted immediately. A registered archaeologist, chosen by the County in consultation with the Federated Indians of Graton Rancheria and paid for by the District, shall assess the site and submit a written evaluation recommending appropriate actions to take to protect the site and the resources discovered, including monitoring of all subsequent work at the site by a Native American monitor from the Federated Indians of Graton Rancheria or other designated tribal representative. If human remains are encountered, the County Coroner must also be contacted and State law designates procedures to follow in the event that human remains are encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendent" can be designated. No work at the site may recommence without approval of the District. If it is determined that a prehistoric site exists, the following shall be implemented:

(a) No future development activity shall take place at or in close proximity to the prehistoric site within the development area;

(b) The historical site(s) shall be filled to protect the resources there;

(c) No additional excavation shall occur at these locations other than to remove surface organic material; and

(d) The District may be required to submit a revised project to protect the resource(s). No further work at the site may recommence without approval of the Department of Public Works Director. All future development of the site must be consistent with findings and recommendations of an archaeological assessment prepared for the site by a registered archaeologist, as approved by the CDA staff.

MITIGATION MONITORING MEASURES

V.14(a)-1. In the event of discovery, DPW staff shall verify that a report has been submitted and all construction work has been stopped. In the event that the report indicates that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, DPW staff shall verify that a registered archaeologist has been retained to assess the site and has submitted a written evaluation to DPW advancing appropriate conditions to protect the site and the resources discovered before work commences on the site. If human remains are encountered, DPW staff shall verify that the County Coroner has been contacted and that all future work is carried out in accordance with the mitigation measures.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Have the potential to cause a physical change which would adversely affect unique ethnic cultural values, or religious or sacred uses within the project area? (source #(s): 1, 3)	[ ]	[ ]	[X]	[ ]

No known ethnic, religious or sacred uses are known to exist on or near the project sites. As noted above, the only structures included in the project description are maintenance facilities including weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. No other structures are involved. Accordingly, the proposed maintenance project would not have a significant impact on unique ethnic, cultural or religious uses or structures.

15. SOCIAL AND ECONOMIC EFFECTS. ***Would the proposal result in:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
Any physical changes which can be traced through a chain of cause and effect to social or economic impacts. (source #(s): 1, 3)	[ ]	[ ]	[X]	[ ]

The maintenance project will not result in any known physical changes to social or economic entities. Therefore, this is a less-than-significant impact.

VI. **MANDATORY FINDINGS OF SIGNIFICANCE.** Pursuant to Section 15065 of the State EIR Guidelines, a project shall be found to have a significant effect on the environment if any of the following are true:
(Please explain your answer after each question

		Yes	No	Maybe
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? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]
b)	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]
c)	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). *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project and the entire maintenance program would be mitigated to a level of insignificance. Therefore, this project has no cumulatively considerable effects. See Attachment B for assessment of cumulative impacts and mitigation measures associated with the overall maintenance program at 47 culvert/drainage sites in West Marin.*	[ ]	[X]	[ ]
d)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]

VII. PROJECT SPONSER'S INCORPORATION OF MITIGATION MEASURES:

Acting on behalf of the project sponsor or the authorized agent of the project sponsor, I (undersigned) have reviewed the Initial Study for the Marin County Flood Control and Water Conservation District's Routine Maintenance Activities Program (RMA), and have particularly reviewed the mitigation measures and monitoring programs identified herein. I accept the findings of the Initial Study, including the recommended mitigation measures, and hereby agree to modify the proposed project application now on file with Marin County to include and incorporate all mitigation measures and monitoring programs set out in this Initial Study.

FOR

Robert Beaumont; Director

6/4/12
Date

VII. DETERMINATION: Pursuant to Sections 15081 and 15070 of the State Guidelines, the foregoing Initial Study evaluation, and the entire administrative record for the project:

[ ] I find that the proposed project WILL NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

[X] I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

[ ] I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Signature Rachel Warner Date 2/14/12

Printed Name Rachel Warner Date 2/14/12

RECORD OF PROJECT APPROVAL

CEQA Record of Comments and Responses
Draft Negative Declaration (ND) and Initial Study (IS)

Marin County Flood Control Routine Maintenance Activities

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1) Letter from State of California, Governor's Office of Planning and Research, State Clearinghouse, dated 3-26-12.

Comments: Letter acknowledges that the Clearing House submitted the Initial Study Negative Declaration to the appropriate state agencies for review and they sent copies of comments from the Department of Fish and Game and Cal Trans, which are addressed separately below. State Clearing House acknowledges that Marin County has complied with the review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Response: Response to individual agency comment letters below.

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2) Letter from Scott Wilson; California Department of Fish and Game; Bay-Delta Region; dated 3-19-12.

Comment: This Project will impact the bed, bank, channel, and riparian vegetation along numerous streams in the Project area. 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 Lake and Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of an LSAA is subject to the California Environmental Quality Act (CEQA). DFG, as a responsible agency under CEQA, will consider the CEQA document 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.

Response: The Marin County Flood Control District acknowledges that a 1600 permit is needed for the project and an application for a five year Routine Maintenance Agreement has been submitted to Tim Dodson of the Department of Fish and Game in Region 3.

Comment: DFG recommends that all mitigation measures within the draft MND include the word "shall" as opposed to "should."

Response: The Program documents have been altered to change the word "should" to "shall" in the General Conditions and Avoidance and Minimization Measures where appropriate.

Comments: The comments listed below are related to work conducted near salt or brackish tidal marshlands and potential impacts to Clapper and Black Rails marshlands.

- On page 43, BIRD-1, DFG recommends that all mitigation measures apply to sites that are within 700 feet of salt or brackish tidal marshland.

- Similarly, Mitigation Measures V.7(a)-24 and 25 should be revised to include a 700-foot buffer.

- DFG recommends that Mitigation Measure V.7(a)-23 be revised to state that no work shall occur near the salt marsh within two hours before or after predicted extreme high tides of 6.5 feet above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the Project site.

- DFG recommends that Mitigation Measure V.7(a)-26 be revised to state that any tidal marsh vegetation removal be conducted outside of the breeding season. All vegetation removal should be conducted by hand. To the extent possible, salt mash vegetation should be salvaged and placed back on-site with intention and care given so that the vegetation may reestablish.

- DFG recommends Mitigation Measure V.7(a)-24 be revised to include the following language to protect clapper and black rails:

If maintenance activities are scheduled during the nesting season (February 1st to August 31st , the County will retain a qualified biologist with a valid 10(A)(1)(a) permit for conducting California clapper transect surveys in potential habitat within 700 feet of the Project site. The biologist will submit a survey protocol to the U.S. Fish and Wildlife Service (USFWS) and DFG for approval prior to implementation. The methodology of this survey effort will be developed utilizing USFWS's December 2009 draft survey protocol for California clapper rail and augmented by the Point Reyes Bird Observatory Black Rail Survey Protocol by Jules Evens (unpublished). The following survey effort timing and methodology will be compliant with both protocols:

1. *Surveys will be conducted between January 15 and April 1;*

2. *A minimum of three individual passive-listening surveys will be conducted. If California clapper rails have not been detected after three passive-listening surveys, call-playback methods will be utilized adhering to the requirements of the permit on the fourth survey;*

3. *All surveys will be conducted no less than fourteen days apart from each other;*

4. *The listening station will be manned continuously by at least one biologist during each survey;*

5. Surveys will be conducted at sunrise or sunset. Protocol stipulates that surveys conducted at sunrise will begin 45 minutes before sunrise and continue until 1.25 hours after sunrise and that surveys conducted at sunset will begin 1.25 hours before sunset and continue for 45 minutes after sunset;

6. Surveys will not be conducted when tides greater than 4.5 feet NGVD are predicted at the Golden Gate Bridge during the survey period, or during full moon periods (i.e., clear nights within two days of the actual full moon);

7. Surveys will not be conducted when wind velocities exceed 10 miles-per hour (mph) or wind gusts exceed 12 mph or during moderate to heavy rains; and

8. All rail vocalizations will be noted, including the types, locations and times, on a detailed map of the survey area. Biologists will use compasses and distance sampling techniques to estimate the location of detected rails.

Response: Several of the sites are within (5-10 sites) or immediately adjacent (15-20 sites) to suitable habitat for California clapper rail and California black rails.

The following Avoidance and Minimization Measures shall apply to all sites in or near salt or brackish marshland and will also serve to protect other tidal-marsh dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

- When working within 250 ft. of salt or brackish marshland during the period February 1st through August 31st, presence for either rail species shall be assumed.

For all maintenance activities except for mowing of levees:

- Maintenance activities shall be scheduled to occur between September 1st and January 31st to avoid the rail breeding season.

- Work shall be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active.

- Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work shall occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.

- Activities shall proceed as quickly as possible to reduce disturbance from noise, dust, etc.

- Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If removal is necessary, the work shall be scheduled outside of the breeding season (February 1 – August 31st); all vegetation shall be removed by hand, and shall be salvaged and retained for replacement after work is completed.

- If, for any reason other than fire fuel reduction levee mowing, the District must perform maintenance activities within 250 ft of salt or brackish marshland during the rail breeding season, the District shall retain a qualified biologist to conduct clapper rail surveys in accordance to most currently available protocols from the Department of Fish and Game and the US Fish and Wildlife Service.

Comment: On March 7, 2012, DFG updated the 1995 Staff Report on burrowing owl mitigation. DFG recommends revising Section BIRDS-3 to include these new guidelines which can be found at:
www.dfg.ca.gov/wildlife/nongame/docs/BUOWStaffReport.pdf.

Response: The following Avoidance and Minimization Measures have been included in the RMA program documents to protect burrowing owls:

BIRD-3: Raptors and wading birds- Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them should be minimized.

Burrowing owls, a federal and state species of special concern, are not known at the sites and there are no CNDDB occurrence records for burrowing owl on or near the sites. However, if burrowing owls are observed and/or if signs are found, then guidelines as outlined in the DFG's 2012 Staff Report on Burrowing Owl Mitigation shall be followed.

If work occurs after the nesting season (August 31 – January 31), then avoidance has been achieved and work can proceed. During nesting season, (February 1st - September 1st), the ECC should walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

Comment: DFG recommends that Mitigation Measure V.7(a)-44 and -45 be combined and revised to include the following language:

A qualified biologist should conduct a habitat assessment for potentially suitable bat habitat. If the survey reveals suitable bat habitat and tree removal is scheduled from April16 through August 31 and/or October 16 through February 28 then

presence/absence surveys should be conducted prior to any tree removal. If presence/absence surveys are negative then trees may be removed following the two-phase tree removal system. If presence/absence surveys result in bat occupancy then the occupied trees should only be removed from March 1 through April 15 and/or August 31 through October 15 following the two-phased tree removal system. If trees that are suitable for bat habitat are to be removed from March 1 through April 15 and/or.August 31 through October 15, then the trees should be removed following the two- phased removal system. The two-phased removal system should be conducted over two consecutive days. The first day (in the afternoon), limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures would be avoided, and only branches or limbs without those features would be removed. On the second day, the entire tree would be removed.

Response: These Avoidance and Minimization Measures have been revised in the RMA program documents as recommended.

Comment: The MND identified the possible presence of state-listed species such as, but not limited to, the Central California Coast coho salmon. The California Endangered Species Act (CESA) prohibits take of state-listed species. Please be advised that a 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, mitigations measures and a mitigation monitoring and reporting program. If the project will impact CESA listed species, early consultation is encouraged, as significant modifications to the Project and mitigation measures may be required in order to obtain a CESA Permit.

Response: Marin County Flood Control District acknowledges that a CESA permit is required if any work included in the RMA will have the potential to result in take of a state listed plant or animal. The District notes that there are no activities programmed to date that will cause take of state listed species, but if any new species are listed under CESA and the program has the potential to cause take of those species, the District will initiate early consultation with resource agencies regarding any new mitigations or modifications to the project that may be required to obtain a CESA Permit.

Comment: Page 23 of the draft MND states that there are potential wetlands in the Project area and that a formal wetland delineation will be completed for 38 sites during the spring and summer of 2012. These potential wetlands could be impacted by Project activities. The California Wetlands Conservation Policy goal is to ensure no overall net-loss of wetlands and to achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage. It is the policy of the Fish and Game Commission to seek to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California. The Fish and Game Commission's Wetland Policy stresses the need to compensate for the loss of wetland habitat on an acre-for-acre basis. For every acre of wetland loss, no less than an acre

of wetland must be created from non-wetland habitat. This amount may increase based on the quality of the impacted wetlands. DFG recommends that the Project avoid potential wetland impacts. If avoidance is not possible, fill of wetlands should be minimized and mitigated and such measures should be detailed in the MND.

Response: The estimated number of sites that may be potentially identified as wetlands has been revised from 38 to 17. These sites will be identified during formal wetland delineation and all project activities within a delineated wetland area will avoid direct impacts to the wetland areas. No permanent impacts or fill of wetlands will occur at these sites.

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3) Letter from Gary Arnold; District Branch Chief of Local Development and Intergovernmental Review of State Department of Transportation (CalTrans) dated 12-17-10 and 3-07-12;

Comment: Letter was sent to advise the District that any work or traffic control that encroaches onto State ROW requires an encroachment permit issued by the Department of Transportation.

Response: The District will notify CalTrans and obtain an encroachment permit if any work or traffic control related to the project encroaches to State ROW.

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4) Letter from Barbara Salzman and Phil Peterson; Marin Audubon Society, dated 3-22-12;

Comments: If non-native invasive plants are removed the denuded areas should be replanted with native plants.

Response: Activities conducted for flood control purposes minimize ground disturbance when removing non-native plants. Areas are replanted with seeds and native plants and treated with erosion control measures.

Comment: Mowing for fire fuel reduction could adversely impact avian species nesting along levees.

Response: Avoidance and Minimization Measure (below) has been revised to include mowing of levees:

V.7(a)-21 If work in the riparian zone *or mowing on levees* will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests

are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

Comment: Fallen trees in streams can provide important refuge habitat for fish. Before removal the habitat function that they serve should be assessed. Non-native trees should be left in place if they provide habitat or the habitat function they provide should be replaced in a manner that minimizes fuel build-up.

Response: The role of the Environmental Compliance Coordinator is to walk the site with the project manager before any work begins to assess what vegetation and debris need to be removed and what may remain in the creek. The ECC will be trained and knowledgeable of the benefits of leaving wood in the creek for habitat and will only instruct wood to be removed if it is causing an obstruction that could lead to damage to infrastructure or increase in potential risk for flooding.

Comment: AMMs in Section 7 should include protections for non-listed birds. This is important because many migratory and resident species will be nesting in habitats within the program area.

Response- The following Avoidance and Minimization Measures apply to all birds, not just listed species:

V.7(a)-20. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st, potential impacts will be avoided and no surveys will be required. Because the culverts in the proposed project sites are fairly small, there is minimal likelihood that they would provide suitable habitat for swallows. However, if any culverts show evidence of past or current swallow nesting, the ECC shall identify them and maintenance activities shall occur after August 31 or after all swallows have fledged to avoid impacts.

V.7(a)-21. If work in the riparian zone *or mowing on levees* will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

Comment: Timing issue with work window. Surveys and stop work orders should continue through August for species that re-nest or nest late. Surveys should be conducted within several days of commencement of the work to avoid losing a nest that may be constructed between survey date and work start.

Response: Avoidance and Minimization Measures V.7(a)-2. And V.7(a)-21 (*revised versions below*) protect nesting birds that may be found in the proposed work area both before and after July 31st.:

V.7(a)-2. Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

V.7(a)-21. If work in the riparian zone *or mowing on levees* will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

Comment: Non-native invasive plants should be removed whenever possible. Need to wash tool and clean clothes to avoid spread of non-native invasive plants.

Response: The STRAW program focuses on removal of non-native invasive plants in the riparian zone. STRAW follows the protocols and BMPs identified in the CCNB database for preventing the transfer of invasive plant materials, seeds or disease from one location to another.

Comment: Reach of Arroyo de San Jose adjacent to Bel Marin Keys Blvd. and extending east is owned by Marin Audubon Society. We are pleased about flood control activities but worried about impacts. Encourage non-native removal but not native removal. To avoid nesting impacts perform work after Aug 31. Please notify when work will occur if possible. Take extra care to perform surveys and implement AMMs in this reach (noted Green Heron nest)

Response: The project description includes guidance for removing invasive non-native plants and re-vegetating with native plants where necessary to control erosion and maintain riparian habitat. Native plants are not removed. Birds nesting before and after July 31st are protected by the following Avoidance and Minimization Measures:

Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

If work in the riparian zone or mowing on levees will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

Comment: Map 5 Bel Aire Watershed- take care in this area to leave native plants between houses and tidal marsh during fire fuel reduction activities. If not possible to retain natives because of density of non-natives, replant with native shrubs and grasses immediately.

Response: Comment noted.

Comment: Delete the tidal reach of Larkspur Creek from fire fuel reduction. It is extremely unlikely that fire fuels would build-up in this reach and it is in violation of the permit conditions for this program.

Response: The District does not conduct fire fuel reduction activities in the tidal reach area of Larkspur Creek, just limbing and trimming for flood control purposes

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5) Letter from Sandy Guldman; friends of Corte Madera Creek; CA, dated 3-20-12;

Comments: Map Corrections

On Map 8, the portion of Murphy Creek coincident with Kent Avenue is shown as a site for vegetation maintenance. In fact, Murphy Creek enters a culvert when it meets Kent Avenue, so there is no vegetation to maintain.

On Map 9, it appears that the course of Ross Creek should be adjusted to match the recent LIDAR topography.

Response: Map Corrections noted

Comments: Scope of Maintenance:

Map 7 shows vegetation maintenance along the tidal reach of Larkspur Creek (9-LAR-1); the creek in this reach has tidal marsh plants and does not need maintenance. Currently, adjacent riparian areas on the right bank are maintained by Friends of Corte Madera Creek Watershed. Non-native vegetation along the left bank will be removed and native plants installed as part of the Rose Garden project, which is just beginning.

One site on Map 8 is designated for fuels reduction. It seems unlikely that there is any riparian vegetation that should be removed to reduce fuels. The site is along a berm

adjacent to wetlands; it appears that a very much smaller area could be designated for fuels management, focusing on the area nearest the homes.

One site on Map 9 has a few broom plants on the bank of Corte Madera Creek, but great care should be taken during vegetation maintenance on that site because it is an important source of dogwood cuttings for revegetation projects. The upland areas are limited in extent and could be easily mowed without impacting riparian vegetation.

Four new culverts were installed during the Kentfield Force Main replacement project: one on Beren's Drainage and three on McAllister Slough. The interiors of these culverts should be cleaned regularly to prevent the growth of organisms and the accumulation of debris, both of which would reduce capacity. Although we appreciate the emphasis on limiting maintenance to protect resources, leaving out cleaning the interiors of culverts overlooks the value of maintaining flow.

The tide gate on the Berens Drainage, to comply with California Department of Fish and Game conditions, should be kept open during the summer to allow tidal flow into the wetland.

One site on Map 9 has a few broom plants on the bank of Corte Madera Creek, but great care should be taken during vegetation maintenance on that site because it is an important source of dogwood cuttings for revegetation projects. The upland areas are limited in extent and could be easily mowed without impacting riparian vegetation.

Response: Comments noted and information passed on to project manager.

Comments : Mitigation Measures: Starting at the bottom of page 43, BIRD-4 identifies measures to protect various birds. We urge you to carefully enforce these measures, including establishing non-disturbance buffer zones around nests or avoiding work at the site.

Response: Mitigation measure V.7(a)-2 addresses this issue:

V.7(a)-2. Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE,
USFWS, NMFS, and/or CDFG).

Comment: The last paragraph on page 47 reads: the ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or

any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

The spread of invasive upland plants and diseases is also a serious concern. We request that you add a requirement that tires, equipment, boots, clothing, and any other item that could transfer seeds or disease be thoroughly washed before being moved between work areas in different sub-watersheds.

Response: Comments noted.

Comment: To improve readability (and printability for those of us who do not have plotters), we also recommend that the large table in Attachment B be divided up so that each zone is in a separate table.

Response: Comment noted

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6) E-mail from Sebastyen Jackovics dated 3-07-12;

Comment: We request notification of all projects as it may relate to Marin County Flood Control and Conservation actions within the area effecting our properties in Corte Madera at 101 Nellen; 150 Nellen; 110 Nellen; 200 Nellen; 10 Fifer; and 2 Fifer

Response: The proposed project activities will be conducted on public lands owned or under easement by the County of Marin. No work will be conducted on private property unless the Marin County Flood Control District enters into an agreement with the private landowner with a Right-to-Enter for construction agreement in place.

Comment: We also want to bring our concerns about additional run off and flooding issues that will likely be created by road and freeway modifications as it relates to the possible 101 freeway project at the Lucky Drive interchanges.

Response: Highway 101 is a State Highway and any work done would be under the jurisdiction of CalTrans, not the Marin County Flood Control District.

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7) E-mail from Eva Buxton; California Native Plant Society; dated 3-19-12

Comments: Please let me know if any impacts to special-status species are expected in the present project.

Response: We don't anticipate impacts to listed plant species with this project since the work is routine maintenance on sites that have been regularly disturbed for flood protection for many years. Any listed plants or animals with the potential to occur in the project areas have Avoidance and Minimization Measures in place to identify them via pre-project surveys or to protect them during project implementation.

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8) E-mail from Doreen Smith; California Native Plant Society; dated 3-19-12

Comments: I'm assuming that the Flood Control district will be doing surveys and follow the protocol outlined in supporting documents: Marin County Flood Control - RMA Program Supporting Documents below: (basis for the Neg Dec)?

(4.4; PLA-2; p. 32-33) "If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000). Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site. If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDB documenting the species and location."

Response: Yes, following the protocols outlined above is integrated into the Routine Maintenance Activities Program.

Comments: Regarding plant species of concern: Pt. Reyes Bird's beak, Cordylanthus maritimus ssp. palustris is strictly a plant of saltmarshes, it's taxonomy has been updated to Chloropyron maritimum ssp. palustre.

Pale yellow tarplant/hayfield tarplant has had a significant taxonomic revison: what once was recognized as Hemizonia congesta ssp. leucophylla is now known to be H. congesta ssp. congesta .It has WHITE flowers (that may turn yellow in dried herbarium specimens) . It is fairly common in grassland in theTomales area but very rarely encountered otherwise in Marin County. The common grassland yellow tarplant, ONCE THOUGHT to be H. congesta spp. congesta is NOW H. congesta ssp. lutescens and is NOT a species of concern. Marsh microseris, Microseris paludosa, so far seems to be extiripated from all historic locations except on Pt. Reyes Peninsula. It grows in seasonally moist grassland swales. Marin knotweed, Polygonum marinense, grows at the high tideline with pickleweed, Salicornia pacifica, in saline and brackish marshes .

Response: Comments noted.

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

RECEIVED
MAR 26 2012
MARIN COUNTY
DEPARTMENT OF PUBLIC WORKS

March 22, 2012

Kallie Kull
Marin County Flood Control District and Water Conservation
3501 Civic Center Drive, Rm 304
San Rafael, CA 94903

Subject: Marin County Flood Control Routine Maintenance Activities Program
SCH#: 2012022053

Dear Kallie Kull:

The State Clearinghouse submitted the above named Mitigated Negative Declaration to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on March 21, 2012, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

Document Details Report
State Clearinghouse Data Base

SCH# 2012022053
Project Title Marin County Flood Control Routine Maintenance Activities Program
Lead Agency Marin County Flood Control District

Type MND Mitigated Negative Declaration

Description The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Leveè maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities.

Lead Agency Contact

Name Kallie Kull
Agency Marin County Flood Control District and Water Conservation
Phone 415 473 6532 **Fax**
email
Address 3501 Civic Center Drive, Rm 304
City San Rafael **State** CA **Zip** 94903

Project Location

County Marin
City Unincorporated
Region
Lat / Long
Cross Streets
Parcel No. County jurisdictions
Township **Range** **Section** **Base**

Proximity to:

Highways Hwy 101
Airports
Railways
Waterways numerous East Marin County waterways
Schools
Land Use

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Public Services; Recreation/Parks; Soil Erosion/Compaction/Grading; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Landuse

Reviewing Agencies Resources Agency; Department of Fish and Game, Region 3; Department of Parks and Recreation; Department of Water Resources; Office of Emergency Management Agency, California; California Highway Patrol; Caltrans, District 4; State Water Resources Control Board, Division of Water Rights; Regional Water Quality Control Board, Region 2; Department of Toxic Substances Control; Native American Heritage Commission

Date Received 02/21/2012 **Start of Review** 02/21/2012 **End of Review** 03/21/2012

Note: Blanks in data fields result from insufficient information provided by lead agency.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5541
FAX (510) 286-5559
TTY 711

Flex your power!
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3/21/12 Clearinghouse

March 7, 2012

MRN000074
SCH 2012022053

Ms. Kallie Kull
Marin County Flood Control and Water Conservation District
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Dear Ms. Kull:

Marin County Flood Control Routine Maintenance Activities Program – Mitigated Negative Declaration

Thank you for including the California Department of Transportation (Department) in the environmental review process for the proposed project. The Department is particularly concerned with the potential for work within State right-of-way (ROW), particularly on US-101 and/or State Route (SR) 37.

Encroachment Permit
Please be advised that any work or traffic control that encroaches on State ROW requires an encroachment permit issued by the Department. Further information is available on the following website: http://www.dot.ca.gov/hq/traffops/developserv/permits/.

To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW must be submitted to the address below. Traffic-related mitigation measures should be incorporated into the construction plans during the encroachment permit process.

Office of Permits
California Department of Transportation, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Should you require further information or have any questions regarding this letter, please contact Connery Cepeda of my staff at (510) 286-5535.

Sincerely,

GARY ARNOLD
District Branch Chief
Local Development – Intergovernmental Review

c: Scott Morgan (State Clearinghouse)

State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
(707) 944-5500
www.dfg.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

RECEIVED
MAR 22 2012
MARIN COUNTY
DEPARTMENT OF PUBLIC WORKS

March 19, 2012

Ms. Kallie Kull
Marin County Flood Control and Water Conservation District
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Dear Ms. Kull:

Subject: Marin County Flood Control Routine Maintenance Activities Program, Mitigated Negative Declaration, SCH #2012022053, Marin County

The Department of Fish and Game (DFG) has reviewed the draft Mitigated Negative Declaration (MND) for the Marin County Flood Control Routine Maintenance Activities Program (Project). DFG is providing comments on the draft MND as a Trustee Agency and Responsible Agency. As Trustee for the State's fish and wildlife resources, DFG has jurisdiction over the conservation, protection, and management of the fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species for the benefit and use by the people of California.

The proposed Project is a program of routine maintenance flood control activities that will be implemented by the Marin County Flood Control and Water Conservation District. Activities will be located within eastern Marin County and include the Novato, Richards Bay, Bel Air and Strawberry Circle, Santa Venetia, and Ross Valley Flood Control Zones (#1, 3, 4, 7, and 9, respectively), as well as the Upper Lucas Valley which is defined as County Service Area 13. Within these Flood Control Zones and Service Area, five general types of flood control activities are proposed. These are: 1) vegetation management, 2) sediment and debris removal, 3) erosion control, 4) maintenance and repair of flood control structures, and 5) levee maintenance. Ninety three (93) specific sites have been identified in this Project.

General Comments

This Project will impact the bed, bank, channel, and riparian vegetation along numerous streams in the Project area. 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 Lake and Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of an LSAA is subject to the California Environmental Quality Act (CEQA). DFG, as a responsible agency under CEQA, will consider the CEQA document 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 LSAA notification process, please access our website at http://www.dfg.ca.gov/habcon/1600/; or to request a notification package, contact the Lake and Streambed Alteration Program at (707) 944-5520.

DFG recommends that all mitigation measures within the draft MND include the word "shall" as apposed to "should." For example, see Mitigation Measures V.7(a)-48-51.

On page 43, BIRD-1, DFG recommends that all mitigation measures apply to sites that are within 700 feet of salt or brackish tidal marshland. Similarly, Mitigation Measures V.7(a)-24 and 25 should be revised to include a 700-foot buffer.

DFG recommends that Mitigation Measure V.7(a)-23 be revised to state that no work shall occur near the salt marsh within two hours before or after predicted extreme high tides of 6.5 feet above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the Project site. DFG recommends Mitigation Measure V.7(a)-24 be revised to include the following language:

> The County will retain a qualified biologist with a valid 10(A)(1)(a) permit for conducting California clapper transect surveys in potential habitat within 700 feet of the Project site. The biologist will submit a survey protocol to the U.S. Fish and Wildlife Service (USFWS) and DFG for approval prior to implementation. The methodology of this survey effort will be developed utilizing USFWS's December 2009 draft survey protocol for California clapper rail and augmented by the Point Reyes Bird Observatory Black Rail Survey Protocol by Jules Evens (unpublished). The following survey effort timing and methodology will be compliant with both protocols:
>
> 1. Surveys will be conducted between January 15 and April 1;
>
> 2. A minimum of three individual passive-listening surveys will be conducted. If California clapper rails have not been detected after three passive-listening surveys, call-playback methods will be utilized adhering to the requirements of the permit on the fourth survey;
>
> 3. All surveys will be conducted no less than fourteen days apart from each other;
>
> 4. The listening station will be manned continuously by at least one biologist during each survey;
>
> 5. Surveys will be conducted at sunrise or sunset. Protocol stipulates that surveys conducted at sunrise will begin 45 minutes before sunrise and continue until 1.25 hours after sunrise and that surveys conducted at sunset will begin 1.25 hours before sunset and continue for 45 minutes after sunset;

6. Surveys will not be conducted when tides greater than 4.5 feet NGVD are predicted at the Golden Gate Bridge during the survey period, or during full moon periods (i.e., clear nights within two days of the actual full moon);

7. Surveys will not be conducted when wind velocities exceed 10 miles-per-hour (mph) or wind gusts exceed 12 mph or during moderate to heavy rains; and

8. All rail vocalizations will be noted, including the types, locations and times, on a detailed map of the survey area. Biologists will use compasses and distance sampling techniques to estimate the location of detected rails.

DFG recommends that Mitigation Measure V.7(a)-26 be revised to state that any tidal marsh vegetation removal be conducted outside of the breeding season. All vegetation removal should be conducted by hand. To the extent possible, salt mash vegetation should be salvaged and placed back on-site with intention and care given so that the vegetation may reestablish.

On March 7, 2012, DFG updated the 1995 Staff Report on burrowing owl mitigation. DFG recommends revising Section BIRDS-3 to include these new guidelines which can be found at: www.dfg.ca.gov/wildlife/nongame/docs/BUOWStaffReport.pdf.

DFG recommends that Mitigation Measure V.7(a)-44 and -45 be combined and revised to include the following language:

> A qualified biologist should conduct a habitat assessment for potentially suitable bat habitat. If the survey reveals suitable bat habitat and tree removal is scheduled from April 16 through August 31 and/or October 16 through February 28 then presence/absence surveys should be conducted prior to any tree removal. If presence/absence surveys are negative then trees may be removed following the two-phase tree removal system. If presence/absence surveys result in bat occupancy then the occupied trees should only be removed from March 1 through April 15 and/or August 31 through October 15 following the two-phased tree removal system. If trees that are suitable for bat habitat are to be removed from March 1 through April 15 and/or August 31 through October 15, then the trees should be removed following the two-phased removal system. The two-phased removal system should be conducted over two consecutive days. The first day (in the afternoon), limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures would be avoided, and only branches or limbs without those features would be removed. On the second day, the entire tree would be removed.

The MND identified the possible presence of state-listed species such as, but not limited to, the Central California Coast coho salmon. The California Endangered Species Act (CESA) prohibits take of state-listed species. Please be advised that a 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.

Page 23 of the draft MND states that there are potential wetlands in the Project area and that a formal wetland delineation will be completed for 38 sites during the spring and summer of 2012. These potential wetlands could be impacted by Project activities. The California Wetlands Conservation Policy goal is to ensure no overall net-loss of wetlands and to achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage. It is the policy of the Fish and Game Commission to seek to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California. The Fish and Game Commission's Wetland Policy stresses the need to compensate for the loss of wetland habitat on an acre-for-acre basis. For every acre of wetland loss, no less than an acre of wetland must be created from non-wetland habitat. This amount may increase based on the quality of the impacted wetlands. DFG recommends that the Project avoid potential wetland impacts. If avoidance is not possible, fill of wetlands should be minimized and mitigated and such measures should be detailed in the MND.

If you have any questions, please contact Mr. Timothy Dodson, Environmental Scientist, at (707) 944-5513 or by email at tdodson@dfg.ca.gov; or Ms. Stephanie Buss, Staff Environmental Scientist, at (707) 944-5502.

Sincerely,

Scott Wilson
Acting Regional Manager
Bay Delta Region

cc: State Clearinghouse

Friends of Corte Madera Creek Watershed

P.O. Box 415 · Larkspur · California 94977

info@friendsofcortemaderacreek.org (415) 456-5052 www.friendsofcortemaderacreek.org

March 20, 2012

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MAR 22 2012

MARIN COUNTY
DEPARTMENT OF PUBLIC WORKS

Kallie Kull, Senior Planner
Marin County DPW
3501 Civic Center Drive Room 304
San Rafael CA 94903

RE: Routine Maintenance Program (RMA) in Eastern Marin County
Draft Negative Declaration of Environmental Impact

Dear Ms. Kull, Kallie

Friends of Corte Madera Creek Watershed appreciates the opportunity to comment on the RMA Negative Declaration. In general, we are impressed by the scope of the documents. Our comments are in three categories: map corrections, scope of maintenance, and mitigation measures.

Map Corrections:

1. On Map 8, the portion of Murphy Creek coincident with Kent Avenue is shown as a site for vegetation maintenance. In fact, Murphy Creek enters a culvert when it meets Kent Avenue, so there is no vegetation to maintain.
2. On Map 9, it appears that the course of Ross Creek should be adjusted to match the recent LIDAR topography.

Scope of Maintenance:

3. Map 7 shows vegetation maintenance along the tidal reach of Larkspur Creek (9-LAR-1); the creek in this reach has tidal marsh plants and does not need maintenance. Currently, adjacent riparian areas on the right bank are maintained by Friends of Corte Madera Creek Watershed. Non-native vegetation along the left bank will be removed and native plants installed as part of the Rose Garden project, which is just beginning.
4. One site on Map 8 is designated for fuels reduction. It seems unlikely that there is any riparian vegetation that should be removed to reduce fuels. The site is along a berm adjacent to wetlands; it appears that a very much smaller area could be designated for fuels management, focusing on the area nearest the homes.
5. One site on Map 9 has a few broom plants on the bank of Corte Madera Creek, but great care should be taken during vegetation maintenance on that site because it is an important source of dogwood cuttings for revegetation projects. The upland areas are limited in extent and could be easily mowed without impacting riparian vegetation.
6. Four new culverts were installed during the Kentfield Force Main replacement project: one on Berens Drainage and three on McAllister Slough. The interiors of these culverts should be cleaned regularly to prevent the growth of organisms and the accumulation of debris, both of which would reduce capacity. Although we

appreciate the emphasis on limiting maintenance to protect resources, leaving out cleaning the interiors of culverts overlooks the value of maintaining flow. Also, the tide gate on the Berens Drainage, to comply with California Department of Fish and Game conditions, should be kept open during the summer to allow tidal flow into the wetland.

7. One site on Map 9 has a few broom plants on the bank of Corte Madera Creek, but great care should be taken during vegetation maintenance on that site because it is an important source of dogwood cuttings for revegetation projects. The upland areas are limited in extent and could be easily mowed without impacting riparian vegetation.

Mitigation Measures:

8. Starting at the bottom of page 43, BIRD-4 identifies measures to protect various birds. We urge you to carefully enforce these measures, including establishing non-disturbance buffer zones around nests or avoiding work at the site.

9. The last paragraph on page 47 reads:
The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

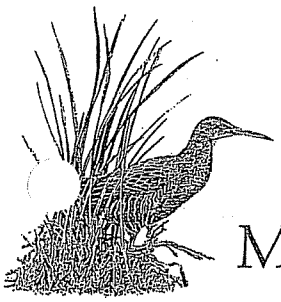
   The spread of invasive upland plants and diseases is also a serious concern. We request that you add a requirement that tires, equipment, boots, clothing, and any other item that could transfer seeds or disease be thoroughly washed before being moved between work areas in different sub-watersheds.

To improve readability (and printability for those of us who do not have plotters), we also recommend that the large table in Attachment B be divided up so that each zone is in a separate table.

Sincerely,

Sandy

Sandra Guldman, President



Marin Audubon Society

P.O. Box 599 | Mill Valley, CA 94942-0599 | marinaudubon.org

March 22, 2012

Kalli Kull, Senior Planner
Marin County DPW
3501 Civic Center Drive, Rm. 304
San Rafael, CA 94993

RE: MARIN COUNTY FLOOD CONTROL ROUTINE MAINTENANCE PROGRAM

Dear Ms. Kull:

Marin Audubon appreciates the opportunity to comment on the routine maintenance program and thank you for sending the draft Negative Declaration, maps and plans related to this program. The stated purpose of the program is to reduce the risk of flooding on Marin County streams in and around flood control facilities. The program is intended to avoid high impact activities, such as major dredging projects and DPW is seeking a general permit for these activities.

The project plans contain many conditions that, if followed, will provide important protections for wildlife and their habitats, such as leaving snags and retaining maximum vegetation. We have the following comments and questions:

- While the purpose of the project is flood control, the scope of work includes "fire fuel reduction" activities to reduce fuel loads. A fuel reduction purpose is likely to have a more aggressive approach to vegetation removal which could be in conflict with protecting the natural environment that is discussed in this Negative Declaration. The fuel reduction measures are apparently achieved by (p. 5) removing invasive non-native species, mowing the tops of banks and levees, and removing downed trees.

We have no problem with removing non-native invasive species as long as the denuded areas are revegetated with native plants. Mowing the upper parts of levees or berms, however, could adversely impact avian species nesting along levees. Fallen trees in streams can provide important refuge habitat for fish. Before removal, the habitat function that they serve should be assessed. Non-native trees should be left in place if they provide habitat, or the habitat function they provide should be replaced in a manner that minimizes fuel build up.

- CWP Policy BIO 1.1 and BIO 2.5 call for protecting migratory species and wildlife movement corridors. The discussion only addresses requiring surveys for special status species and wetlands which do not comply with BIO 1.1 and BIO 2.5. There are General Conditions and Avoidance and Minimization Measures for non-special status nesting species but these are not mentioned.

The BIOLOGICAL RESOURCES (7.) discussion lists "proposed" Mitigations "to avoid and minimize the reduction in the number of endangered, threatened and rare species or alteration of their habitat...." These Mitigations include GENERAL CONDITIONS and SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES for birds, raptors, wading birds and land birds. We, however, could not find a commitment to implement the measures for non-listed birds. This is important because many migratory and resident species will be nesting in habitats that are covered by this program.

- There appear to be some discrepancies in the timing of the work windows. CWP BIO 2.5 calls for restricting disturbance in sensitive habitat during nesting season from March 1 through August 1 to protect bird nesting, rearing and feeding activities. The general work window, however, would allow work in that time period, from April 15 to October 15. The general work window for birds begins July 31, which is fine. It should be recognized, however, that some species nest late and some re-nest, particularly if there has been problem with their first attempt. Surveys and stop work order requirements should continue through August for landbirds, raptors and wading birds to ensure protection of nests. In addition, except during the very end of the nesting season, surveys should be conducted within several days of the commencement of work to avoid losing a nest that may be constructed in the interim.

- Invasive non-native plants should be removed wherever possible. In addition to the transport methods noted on page 50, seeds and pieces of invasive plants can be transported in clothing, shoes and work equipment (clippers, shovels, spades, etc.). In order to prevent or minimize the spread of invasives, the above mentioned clothing and equipment should be washed or cleaned at each new site. This should apply to eh STRAW program as well.

Comments on Maps:

Map 2 Novato. The reach of Arroyo de San Jose adjacent to Bel Marin Keys Boulevard extending east and downstream of the Humane society is owned by MAS. Mas property is a dense mix of native riparian and non-native species. Vegetation maintenance is shown for this segment and fuel reduction is shown further downstream. While we are pleased that the county maintains flood control responsibility, we are also concerned about impacts. We encourage removal of non-natives but not natives and, to avoid nesting impacts, we ld like the work should be performed in the non-nesting season after August 31. If possible we would like to kn/ow what work is planned and when it will be performed.

We also note that particular care should be taken in performing surveys and avoidance measures along this creek. It was further downstream on this where the Green Heron nest was cut down some years ago in the process of removing a tree limb.

Map 5 Bel Aire Watershed. The small area adjacent to the north of the tidal marsh is shown for fuel reduction. This area provides a buffer from uses of adjacent houses. It is important that a fringe of native species remain for refuge habitat along the marsh edge. Care should be taken to leave natives wherever possible. If this is not possible, and if there are many non-natives, the area should be revegetated with native shrub and grass species quickly.

Maps 7 and 8 Map 7 shows vegetation maintenance along Larkspur Creek and Map 8 shows an even longer stretch of Larkspur Creek that is slated for fuel reduction Larkspur Creek is tidal to upstream beyond Doherty Drive. Removing vegetation through this reach is not only unnecessary, but would remove tidal marsh vegetation and would be in violation of the condition for this permit It is extremely unlikely that any vegetation would be a fuel risk in this section. The tidal reach of Larkspur Creek should be deleted from the program.

Map 9 The section identified as for fuel reduction does not appear to be necessary. Care should be taken to remove non-native broom.

Thank you for considering our comments.

Sincerely,

Barbara Salzman, Co-chair
Conservation Committee

Phil Peterson, Co-chair
Conservation Committee

Kull, Kallie

:
Subject: Kull, Kallie
RE: No 227 February 22, 2012

From: seb [mailto:sjackovics@aol.com]
Sent: Wednesday, March 07, 2012 2:12 PM
To: EnvPlanning,
Cc: zsolt@ggsf.com; t.jackovics@comcast.net
Subject: No 227 February 22, 2012

Kallie Kull and to whom it may concern,

We write you on behalf of the ownership for commercial properties located in Corte Madera at the following addresses:

101 Nellen

150 Nellen

110 Nellen

200 Nellen

10 Fifer

Fifer

We request notification of all projects as it may relate to Marin County Flood Control and Conservation actions within the area effecting our properties in Corte Madera.

We also want to bring our concerns about additional run off and flooding issues that will likely be created by road and freeway modifications as it relates to the possible 101 freeway project at the Lucky Drive interchanges.

Please keep us informed and log our concerns and ADDRESS in the EIR process.

Sincerely,

Sebastyen Jackovics

Kull, Kallie

:
Subject: Kull, Kallie
RE: Marin CNPS

From: Eva Buxton [mailto:evabuxton@sbcglobal.net]
Sent: Tuesday, March 20, 2012 8:24 PM
To: Choo, Chris
Cc: Kull, Kallie; Williams, Laurie; Lewis, Liz; Doreen Smith; carnelian@pacbell.net
Subject: Re: Marin CNPS

Hi,

I'm sorry that I was not aware of the fact that CNPS is always notified when a CEQA document is prepared for a County project, including private ones. I know now! I assume that the areas to be impacted have been surveyed by a botanist or someone with enough botanical knowledge to id the plants of concern, as was outlined in the Neg Dec and its supporting document. I understand that Doreen offered to help out. Although I normally comment on CEQA documents, I would not be able to do so before the deadline this coming Thursday. I would appreciate it if CNPS could receive notifications of projects a little more in advance in order for volunteers to address issues.

. lease let me know if any impacts to special-status species are expected in the present project.

Eva Buxton
Conservation Chair

Kull, Kallie

Subject: Kull, Kallie
RE: Marin CNPS

From: Doreen Smith [mailto:dlsmith@lvha.net]
Sent: Monday, March 19, 2012 12:13 PM
To: evabuxton@sbcglobal.net; Kull, Kallie
Cc: Doreen L. Smith; carnelian@pacbell.net
Subject: Re: Marin CNPS :

Kalllie, Eva,

When Ruth Pratt was employed , I was her liaison with Marin DPW when rare plants were suspected to be in the way of drainage-correction problems.I can come out and check sites when necessary.

Those species of concern:

Pt. Reyes Bird's beak, Cordylanthus maritimus ssp. palustris is strictly a plant of saltmarshes, it's taxonomy has been updated to Chloropyron maritimum ssp. palustre.

Pale yellow tarplant/hayfield tarplant has had a significant taxonomic revison: what once was recognized as Hemizonia congesta ssp. leucophylla is now known to be H. congesta ssp. congesta .It has WHITE flowers (that may turn yellow in dried herbarium specimens) . It is fairly common in grassland in theTomales area but very rarely encountered otherwise in Marin County. The common grassland yellow tarplant, ONCE THOUGHT be H. congesta spp. congesta is NOW H. congesta ssp. lutescens and is NOT a species of concern.

Marsh microseris, Microseris paludosa, so far seems to be extiripated from all historic locations except on Pt. Reyes Peninsula. It grows in seasonally moist grassland swales

Marin knotweed, Polygonum marinense, grows at the high tideline with pickleweed, Salicornia pacifica, in saline and brackish marshes .

Doreen Smith (Rare Plant information co-ordiantor, Marin Chapter CNPS.

Kallie,

Thanks for your information. I'm not quite sure why you contacted the CNPS unless the Flood Control district has been asked to do so in the past. It appears that your maintenance will take place on disturbed land. It's not possible for me to determine if the four plants listed in the documents (Point Reyes bird's beak, hayfield tarplant, marsh microseris, Marinknotweed) have been found on the sites in the past.

Below is a portion from Marin County Flood Control - RMA Program Supporting Documents - basis for the Neg Dec
(4.4; PLA-2; p. 32-33)

"If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S.

Fish and Wildlife Service 2000).
Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture floristic diversity present at the site.
If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.
Marin County Flood Control and Water Conservation District / RMA Program 33
For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDB documenting the species and location."

I'm assuming that the Flood Control district will be doing surveys and follow the protocol outlined in documents.

Please let me know more specifically what you might expect the CNPS to do.

Eva

Kull, Kallie

From: Kull, Kallie
Sent: Friday, March 16, 2012 3:45 PM
To: 'mwilliams@lgvsd.org'
Cc: Williams, Laurie; Taylor, Tammy
Subject: Routine Maintenance Activities- Miller and Gallinas Creeks
Attachments: AppendixA_RMA_Master_List_Project_Sites.pdf; AppendixB_RMA_Sediment_Removal_Sites.pdf

Hi Mark-

I received your request (below) from our planning department and am forwarding you the main spreadsheets that describe the types of Flood Control Routine Maintenance activities within the Miller and Gallinas Creek watersheds. When viewing the main list entitled Appendix A Master List, you can scroll down to find the activities listed for Gallinas Creek under Flood Zone 7 and activities for Miller Creek at the very bottom of the page under CSA 13 (Community Service Area).

The second spreadsheet lists the sediment removal sites Zone 7 where Gallinas Creek is located. There are no proposed sediment removal sites in Miller Creek CSA 13 area.

Please let me know if you need anything else to review the CEQA document on this project-

Kallie Kull
Marin County Flood Control and Water Conservation District
473-6532

From: Mark Williams [mailto:mwilliams@lgvsd.org]
Sent: Thursday, March 15, 2012 1:17 PM
To: EnvPlanning,
Cc: Susan McGuire
Subject: Routine Maintenance Activities Draft Negative Declaration

Could you please provide the specific locations and activities to be performed regarding the Miller Creek and Gallinas Creek routine maintenance activities outlined in your notice of availability?

Thank you,

Mark R. Williams
General Manager
Las Gallinas Valley Sanitary District
300 Smith Ranch Road
San Rafael, CA 94903
Phone 415-472-1734
Fax 415-499-7715

Other

(didn't go to DES
unless in previous

NEGATIVE DECLARATION

Marin County
Environmental Coordination and Review

Pursuant to Section 21000 et. seq. of the Public Resources Code and the Marin County Environmental Impact Review Guidelines and Procedures, a Negative Declaration is hereby granted for the following project.

1. **Project Name:** **Marin County Flood Control Routine Maintenance Activities Program**

2. **Location and Description:** **Eastern Marin County Flood Control Zones 1, 3, 4, 7, 9, and Community Service Area 13 in Upper Lucas Valley**

The Marin County Flood Control and Water Conservation District's (MCFCWCD) Routine Maintenance Activities (RMA) program defines the scope and timing of the maintenance activities conducted annually in and around flood control channels and facilities in East Marin County. The MCFCWCD is responsible for maintenance of 37 miles of stream channels, two sediment basins, and numerous flood control facilities throughout East Marin County (e.g. weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drains and pump station inlet/outlet structures). The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Levee maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program does not include projects requiring individual agency permits, such as larger capital improvement projects (e.g. building a new pump station), large dredging projects (e.g. dredging the mainstem of Novato Creek), or new bank stabilization projects using only hardened materials such as rock rip rap. The RMA program establishes programmatic guidance to conduct these maintenance activities for flood control purposes while avoiding and minimizing environmental impacts. The program provides the organizational framework to ensure that routine maintenance work complies with the terms of State and Federal regulations and permit conditions to protect water quality, wetlands and riparian habitats.

3. **Project Sponsor:** **Marin County Flood Control and Water Conservation District**

4. **Finding:** **Based on the attached Initial Study and without a public hearing, it is my judgment that:**

☐ The project will not have a significant effect on the environment.

☒ The significant effects of the project noted in the Initial Study attached have been mitigated by modifications to the project so that the potential adverse effects are reduced to a point where no significant effects would occur.

Rachel Warner
Marin County Environmental Coordinator

Date: 2/14/12

Based on the attached Initial Study and the comments received during the public review period, the Marin County Department of Public Works grants a Negative Declaration.

Date: _____

Robert Beaumont, ctor
Marin County Flood Control and Water Conservation District

5. Mitigation Measures:

(Select one of the following statements)

☐ The Initial Study did not identify any potential adverse impacts and, therefore, the project does not require mitigation measures.

☒ Please refer to mitigation measures in the attached Initial Study.

☐ The Initial Study concludes that the Department can modify the project's potential adverse impacts, as noted under the following factors in the attached Initial Study.

The Department of Public Works has incorporated into the project all of the mitigation measures described in the attached Initial Study.

6. Preparation:

The Marin County Flood Control and Water Conservation District prepared this Negative Declaration and interested parties may obtain copies at the address listed below.

Kallie Kull, Senior Planner
Marin County Department of Public Works
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Monday through Friday
8:30 a.m. to 4:30 p.m.
Telephone (415) 473-6528

MARIN COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DRAFT INITIAL STUDY

Marin County Flood Control District Routine Maintenance Activities Program

I. BACKGROUND

A. Project Sponsor's Name and Address: Marin County Flood Control District
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

B. Lead Agency Name and Address: Marin County Flood Control District
3501 Civic Center Drive, Room 304
San Rafael, CA 94913-4186

C. Contact Person and Phone Number: Kallie Kull; Senior Planner, (415) 499-6532

II. PROJECT DESCRIPTION

A. Project Title: Marin County Flood Control District: Routine Maintenance Activities Program (RMA)

B. Type of Application(s): Flood Control Routine Maintenance Projects

C. Project Location: The geographic extent of the RMA program includes routine maintenance activities carried out in and around creeks, channels, ditches, levees, flood control structures and facilities, located within six project areas: one each for five flood control zones in East Marin County (Zones 1,3,4,7,9), and County Service Area 13 in Upper Lucas Valley (See Figure 1):

Flood Control Zone 1 – Novato
Flood Control Zone 3 – Richardson Bay
Flood Control Zone 4 – Bel Aire and Strawberry Circle
Flood Control Zone 7 – Santa Venetia
Flood Control Zone 9 – Ross Valley
County Service Area 13 – Upper Lucas Valley

Refer to:
Figure 1: Map of County Flood Control Zones and CSA/CSD areas included in the project
Attachment A: Maps 1-12 of Project Areas and Species of Concern
Attachment B: Master list of Project Areas and RMA Activities
Attachment C: Master List of all Sediment Removal Sites

D. General Plan Designation: The proposed project area is vast in extent and includes creeks which are located within the mapped City Centered and Coastal Baylands Corridors of East Marin (Countywide Plan 2007) and within Streamside Conservation Areas (SCAs).

E. Zoning: Project areas within the RMA program fall into the land use and zoning categories of Residential, General Commercial/Mixed Use, Office/Commercial Mixed Use, Neighborhood/Commercial Mixed- Use/ Recreational Commercial, Industrial, Agricultural, Public and Open Space Lands.

PROJECT AREA

The Marin County Flood Control District is responsible for maintenance of 37 miles of stream channels, two sediment basins, and numerous flood control facilities (e.g. weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drains and pump station inlet/outlet structures), throughout East Marin County. The geographic extent of the proposed Routine Maintenance Program (RMA) includes six project areas: one each for five flood control zones (Zones 1, 3, 4, 7 and 9), and one project site in County Service Area 13 in Upper Lucas Valley (*Figure 1*). The Flood Control Zones included in this project are located exclusively in Eastern Marin County. Each zone includes a number of project sites, which are differentiated based on stream reaches and habitat types. In all, there are 93 specific sites where the District performs routine maintenance activities. There are 26 project sites located in Flood Control Zone 1 in the Novato Creek watershed, 33 project sites in Flood Control Zone 3 in Mill Valley, six project sites in Flood Control Zone 4 in Bel Aire/Strawberry, 13 project sites in Flood Control 7 in Santa Venetia, 14 project sites in Flood Control Zone 9 in the Corte Madera Creek watershed, and one project site in County Service Area 13 in Upper Lucas Valley.



Figure 1. Project areas covered by the Marin County Flood Control District's Routine Maintenance Activities Program; Flood Control Zones 1, 3, 4, 7, 9, and Community Service Area 13 in Upper Lucas Valley, all in East Marin County.

PROGRAM OVERVIEW

Program Purpose

The Marin County Flood Control District's Routine Maintenance Activities Program (RMA) defines the types and scope of the District's annual routine maintenance activities conducted in and around flood control channels and facilities. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program establishes programmatic guidance to conduct these activities for flood control purposes while avoiding and minimizing environmental impacts. The RMA program provides the organizational framework for flood control staff and managers to oversee maintenance crews and their activities and to ensure that their work complies with the terms of State and Federal regulations and permit conditions to protect water quality, wetlands and riparian habitats. The RMA program does not include projects requiring individual agency permits, such as larger capital improvement projects (e.g. building a new pump station), large dredging projects (e.g. dredging the mainstem of Novato Creek), or new bank stabilization projects using only hardened materials such as rock rip rap. The District will implement the RMA program in a yearly work cycle, to include pre-project notification, project implementation, and annual reporting.

Jurisdictional Boundaries

Maintenance activities are implemented on an annual basis only in locations where the Marin County Flood Control District and/or its municipal partners own the land outright in fee title or holds legal easements; with the exception of four sites on private property, where the District annually receives written landowner permission before performing maintenance activities. No aspect of the RMA program shall be implemented in areas where the County or its municipal partners do not have direct legal jurisdiction or landowner permission.

Environmental Setting

Eastern Marin County watersheds share the same general anatomy: the ridge-tops and upper slopes of the watersheds are in generally protected open space areas, the valley floors are densely developed, and the lower reaches are tidally-influenced and quite flat. The District's 93 RMA sites are located mainly in the valley floors and lower creek reaches. The uplands encompass the hilly, often steep, terrain from the top of the ridges down to where the valleys flatten out. They are dominated by mixed evergreen forest and oak-bay woodlands, interspersed with open annual grasslands, chaparral, and coastal scrub. Much of the upland habitats in Marin County are protected as public and municipal open space. The valley floors are developed with dense residential and commercial developments, often right up to, and sometimes in, the creek channels. The road network can also be quite dense, with many bridges spanning the creeks. In almost all cases, creeks are heavily impacted by historic human use, including concrete channelization and straightening, constrained riparian corridors, impacted floodplains, and non-native invasive species. The lower reaches of creeks have very little topographic relief, they are either tidally influenced and support saltwater or brackish-water marsh, or are protected by levees for agricultural or residential use. While often less developed, these lower marsh areas have altered hydrology and are constrained by roads, levees, and other human-induced development. Freshwater seasonal wetlands have become established in areas that were once historical baylands and which have been diked for agriculture. These seasonal wetlands provide habitat for migratory waterfowl and shorebirds, including California clapper and black rails.

Scope of Work

The RMA program covers five categories of routine flood control maintenance activities:

1) Vegetation management
2) Sediment and debris removal
3) Erosion control
4) Maintenance and repair of flood control structures
5) Levee maintenance

1) Vegetation Management Activities are employed to achieve three main goals:

- maintain channel function
- reduce fire fuels,
- restore creek habitat

These goals are achieved by removing invasive non-native plants and re-vegetating with native plants where necessary to control erosion and maintain riparian habitat. Channel maintenance is achieved by limbing and trimming of riparian trees and shrubs, selective cattail cutting and removing trash. Occasionally trees growing on the channel bed need to be removed because they obstruct flow or divert flow and cause bank erosion. This work is typically limited to the removal of arroyo willow or white alder growing in the center of the channel bed.

Vegetation management activities are performed by crews using hand tools and do not include ground-disturbing activities. Cattails are removed from selected reaches as part of sediment removal activities. All vegetation maintenance is done without the use of herbicides.

Vegetation management takes place from the channel bottom to the top of the high water mark, and includes trimming limbs from trees and shrubs growing over the channel and trimming branches that hang down into the active channel. The goal of vegetation management within natural channels is to establish a canopy cover that will suppress invasive plant growth and maintain cooler stream temperatures.

Fire fuel reduction is achieved by mowing on tops of banks and levees and the thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas.

Tree removal is a rare event with the exception of non-native trees such as acacia. Once or twice a year crews may need to remove a tree that has died and poses a hazard to adjacent structures or could pose a flood hazard if it falls into the channel. Removal of these trees is conducted in consultation with the Department of Fish and Game.

Removal of non-native vegetation takes place as part of maintaining channel function but also occurs in a more strictly restoration-type activity led by Point Reyes Bird Observatory's STRAW Program (Students and Teachers Restoring a Watershed) in partnership with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP). Students working in the STRAW Program remove invasive non-natives and replant sites with native vegetation. The program has worked at creek sites near schools where access and proximity allow for the removal of all traces of the non-native vegetation and the return to sites to continue maintenance and restoration of the creek corridor. These restoration activities have been ongoing for over 10 years. The partnership with the STRAW Program demonstrates the County's efforts to manage creeks through stewardship of the land. Native plant restoration reduces the maintenance needs in these creeks and allows for better habitat to be established in the urban creek corridors. The students, teachers and parents working in their local creeks increases the community awareness of the habitat and supports the County's watershed-based approach to caring for our creeks.

2) Sediment and Debris Removal

Sediment and debris removal from channels, sediment basins and around flood control facilities (e.g. trash racks) is completed on a routine basis in order to maintain channel function and facilitate unobstructed flow around structures including bridges, storm drain outlets, and pump stations. Excavated sediment is hauled away to a permitted spoils disposal site. Debris items found in the channels and around flood control facilities (e.g. tires, shopping carts, trash, furniture), are typically removed by hand and hauled to a certified disposal site, such as a landfill. Attachment B lists all sediment removal sites included in the RMA program with specific information regarding dimensions of work area, equipment used, location of equipment, and expected duration of work at each site.

3) Erosion Control

Erosion control activities take place only where the District and/or its partners hold fee title to the land. Most large erosion control and large bank stabilization projects are not routine and therefore are not included in the RMA program. The only erosion control projects included in the RMA program are those where a failing streambank is composed of earthen materials and biotechnical engineering techniques are used to stabilize the bank and prevent further erosion (e.g. brush mattresses and willow walls). Erosion control activities will generally be minor in nature and completed in 2-4 days.

4) Maintenance and Repair of Flood Control Structures

Annual routine maintenance and repair of Marin County flood control structures is a key objective of the RMA program. Flood control structures are defined to include all structures built or maintained by the District, including, but not limited to, weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drain or pump station inlet/outlet structures and similar structures. The maintenance, repair or rehabilitation of flood control structures does not exceed 100 linear feet upstream or downstream of each structure and does not include increasing the footprint of any structure.

5) Levee Maintenance and Repair

Levee maintenance includes mowing levee tops and banks above the high water line for fire fuel reduction, stabilizing levees by placing fill on the levee tops, and controlling burrowing rodent populations. Levee stabilization may occur on any levee maintained by the District; a landowner access agreement is required for activities at site 7-GAL on the Santa Venetia levee, which is private property. If a gopher infestation occurs, the gophers are trapped and their burrows are filled with an earth/concrete mix or bentonite, following FEMA guidelines. The County of Marin does not use rodenticides or other poisons in rodent control for levee maintenance or in any other RMA program activity.

PROGRAM IMPLEMENTATION

Environmental Staff and Oversight

The Marin County Flood Control District will designate environmental staff who will provide day-to-day oversight of the RMA program including: 1) pre-project planning and notification to applicable resource agencies, 2) pre-project surveys for special status wildlife and plant species depending on site location and designated work windows, 3) project implementation including site surveys, conducting crew trainings, and coordinating with crews in the field, and 4) annual reporting to permitting resource agencies. The District will designate Environmental Compliance Coordinators (ECCs) to specifically oversee the biological aspects of the RMA program. The ECCs shall have an understanding of biological resources, permit regulations that may affect listed species and/or water quality, familiarity with the maintenance activities, and how to implement Avoidance and Minimization Measures and BMPs in the field. The ECCs will coordinate activities with input and review from County of Marin Public Works' staff biologists.

A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the project's potential

impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Avoidance and Minimization Measures (AMMs) to be employed at each project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

General and activity-specific conditions, AMMs and BMPs are incorporated into the overall project description and spelled out in the individual project fact sheets for each site. The job of the ECCs is to ensure that all measures are employed as prescribed in the field, depending on the location and nature of the activity.

Schedule and Timing of Maintenance Activities

The Routine Maintenance Activities Program is implemented annually throughout the project area in East Marin County. The general work window for RMA activities is the dry season, from April 15th to October 15th, depending on weather. Dry years may mean a longer work season; wet weather may halt the work season early. Table 1 below shows the Special Status Species potentially found within the project area and the established work windows for each species relative to the proposed work periods. As a general rule, work at each site will be scheduled around relevant work windows to avoid impacts. In instances where work needs to be scheduled outside of an established work window for a particular species in a specific location, species-specific pre-construction surveys will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of Avoidance and Minimization Measures before proceeding. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality.

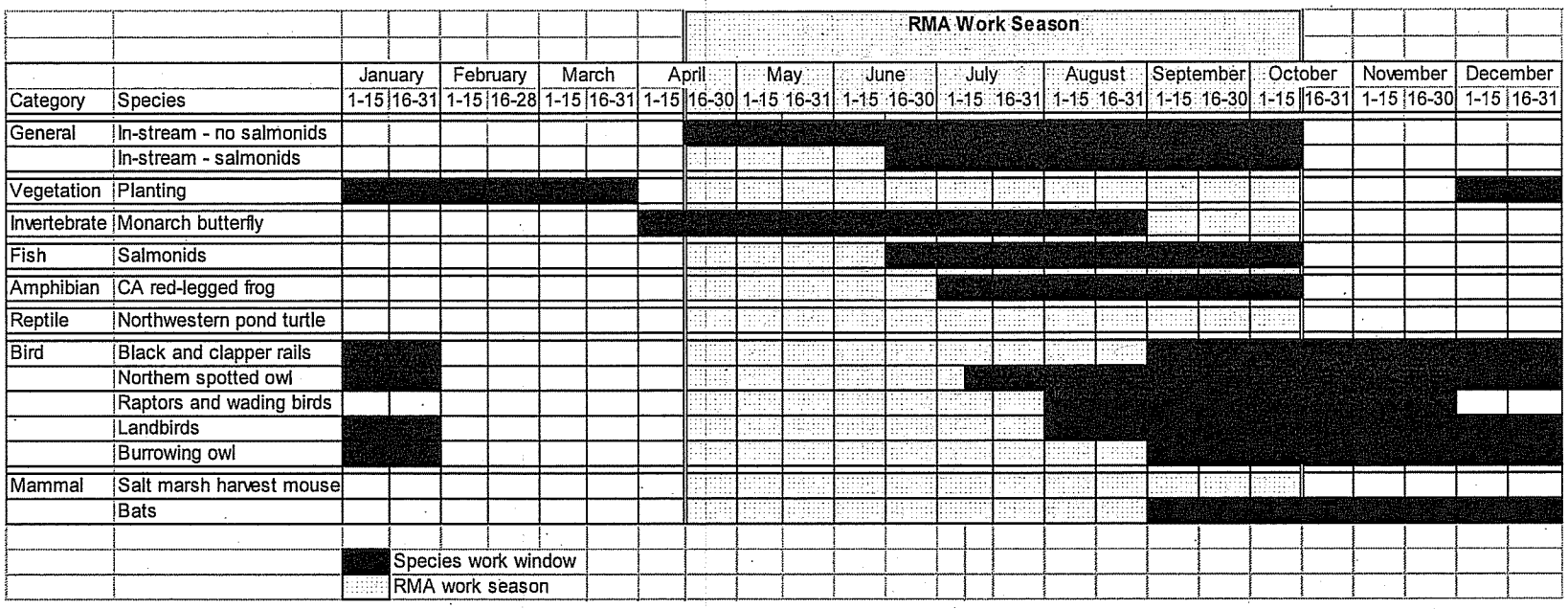


Table 1. Environmental Work Window for Special Status Species relative to the work season for implementation of the RMA Program.

Responsible Parties and Program Partners

Marin County Flood Control and Water Conservation District (District)- The Marin County Flood Control and Water Conservation District is the primary proponent for the RMA program, which utilizes the labor and expertise of the County of Marin Department of Public Works (DPW), County road maintenance crews, Conservation Corps North Bay crews (CCNB), and private contractors to manage and implement routine maintenance activities. The Marin County Flood Control and Water Conservation District (District) was formed in 1955 by an act of the California State Legislature with the primary purpose of controlling flood and storm waters of streams which flow within and into the county. The Marin County Board of Supervisors sits as its board and the District is staffed by the County of Marin Department of Public Works (DPW). The boundaries of the District are contiguous with those of the county and eight flood control zones have been established to address specific issues related to flooding within individual watersheds.

County of Marin Department of Public Works Road Crew (DPW)- DPW road maintenance crews perform a portion of the vegetation management, sediment removal, erosion control, and facility maintenance activities.

Marin County Parks - *The District coordinates with Marin County Parks to perform vegetation maintenance activities on certain lands under their jurisdiction.*

Conservation Corps North Bay (CCNB)- Conservation Corps North Bay is a non-profit job training and educational organization which has been operating in Marin County since 1982. CCNB will be the primary active partner and contractor with the District for many of the activities included in the RMA program. CCNB Maintenance Supervisors and staff will be trained annually by the District staff to incorporate the general and activity-specific conditions, AMMs, and BMPs required for each activity at each site in order to protect water quality, habitat and special status species.

Municipal Partners- Cities of Mill Valley, Novato, Larkspur, Ross, Fairfax, and San Anselmo- In addition to the work it oversees directly on County unincorporated lands, the District has a formal agreement with the City of Mill Valley that enables the City of Mill Valley to perform routine flood control maintenance activities on an annual basis on properties that fall within the District's flood control easements. In Novato, the District performs flood control maintenance activities in areas within the City of Novato's jurisdiction. The District is currently negotiating similar agreements for the District to conduct maintenance activities on a routine basis within the smaller municipalities of the Ross Valley (Cities of Larkspur, Ross, San Anselmo and Fairfax.

MCSTOPPP and STRAW- The District partners with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP) and the Point Reyes Bird Observatory's (PRBO) Students and Teachers Restoring a Watershed (STRAW) to perform restoration work in eastern Marin County. Activities consist primarily of removal of invasive plants and planting of native species by groups of teachers and students organized by STRAW.

Private Contractors - District environmental staff will work with outside contractors prior to implementing activities covered by the RMA. The ECC will be responsible for making sure that hired contractors understand what materials they need to have in hand and what methods to employ when implementing prescribed AMM's and BMPs during and post-construction. Companies contracting with the County of Marin for RMA program activities will be held to standards described in the Specifications that are included in their County contracts.

Foundation Documents for the RMA

The RMA program is largely based on program documents and studies previously developed by the Bay Area Stormwater Management Agencies Association (BASMAA). The District, as a member of MCSTOPPP, has been an active member of BASMAA since 1989. BASMAA is a consortium of 90 Bay Area county and city governments, local water and sanitation districts, and state agencies and was formed in response to the National Pollutant Discharge Elimination System (NPDES) permitting program to promote regional consistency. In 1998, BASMAA formed an Operational Permit Committee (OPC) which worked for several years to develop a Regional General Permit with the USACE to cover routine maintenance activities in flood control channels within BASMAA's jurisdictional areas. Although a Regional General Permit was not obtained, the OPC produced several documents which have been used by several BASMAA members to obtain individual permits. In addition to previous documents developed for BASMAA, the District commissioned a Biologic Assessment for the RMA program. Biological Assessment for Routine Flood Control Maintenance Activities; Marin County, California (July 2011).

The District is utilizing the information in these documents to support programmatic permit applications to the Department of Fish and Game, the Army Corps of Engineers, and the Regional Water Quality Control Board for the RMA program.

- Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works. July 2011.
- Minimal Threat Channel and Basin Maintenance Activities. October 2009. This document describes routine flood control maintenance activities.
- Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. October 2006. This document describes the environmental setting, special status species within the BASMAA jurisdictional area, the extent and scope of proposed activities, and a suite of AMMs and BMPs.
- Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities. June 2000. The manual describes BMPs for equipment and vehicles, sediment control, soil stabilization, natural resource protection and restoration, vegetation and debris management, and water diversions.

III. CIRCULATION AND REVIEW

A. Responsible Agencies: *(agencies whose approval is required and permits needed)*

- U.S. Army Corps of Engineers – Section 404 permit under the Clean Water Act with consultation from the U.S. Fish and Wildlife Service (Endangered Species Act of 1973, as amended) and NOAA Fisheries (Endangered Species Act of 1973, as amended);
- San Francisco Bay Regional Water Quality Control Board – Section 401 Water Quality Certification; and
- California Department of Fish and Game - 1600 Streambed Alteration Agreement Programmatic Routine Maintenance Agreement.

DOCUMENTS INCORPORATED BY REFERENCE

The following is a list of relevant information sources, which have been incorporated by reference into the foregoing Initial Study pursuant to Section 15150 of the State CEQA Guidelines. The number assigned to each information source corresponds to the number listed in parenthesis following the incorporating topical question of the Initial Study checklist. These documents are both a matter of public record and available for public inspection at the County of Marin. Copies of Documents (1-2) below are available for public review at the County of Marin Planning Department (Room 308), 3501 Civic Center Drive, San Rafael, California, Monday through Friday between the hours of 8:00 a.m. to 4:00 p.m. Copies of documents (3-8) are available for public review at the Marin County Public Works Department (Room 304) or at the Marin County website www.marinwatersheds.org. Copies of Documents (9 – 10)) can be found on-line at the individual municipal websites.

1) Marin Countywide Plan, Marin County Community Development Agency, Planning Division (2007).

2) Marin County Code; Supp. No. 6-11, Update 1; (June 7, 2011).

3) A Programmatic Approach to Routine Flood Control Maintenance Activities; County of Marin (October 2011).

4) Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works. (October 2011).

5) Minimal Threat Channel and Basin Maintenance Activities. BASMAA OPC (October 2009).

6) Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. BASMAA OPC October 2006.

7) Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities. BASMAA OPC, (June 2000).

8) County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries; FishNet 4C; Dec 2004; updated 2007)

9) City of Mill Valley General Plan (1989).

10) City of Novato General Plan (1996).

IV. EVALUATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to Section 15063 of the State CEQA Guidelines, and the County EIR Guidelines, Marin County will prepare an Initial Study for all projects not categorically exempt from the requirements of CEQA. The Initial Study evaluation is a preliminary analysis of a project which provides the County with information to use as the basis for deciding whether to prepare an Environmental Impact Report (EIR) or Negative Declaration. The points enumerated below describe the primary procedural steps undertaken by the County in completing an Initial Study checklist evaluation and, in particular, the manner in which significant environmental effects of the project are made and recorded.

A. The determination of significant environmental effect is to be based on substantial evidence contained in the administrative record and the County's environmental database consisting of factual information regarding environmental resources and environmental goals and policies relevant to Marin County. As a procedural

device for reducing the size of the Initial Study document, relevant information sources cited and discussed in topical sections of the checklist evaluation are incorporated by reference into the checklist (e.g. general plans, zoning ordinances). Each of these information sources has been assigned a number which is shown in parenthesis following each topical question and which corresponds to a number on the data base source list provided herein as Attachment A. See the sample question below. Other sources used or individuals contacted may also be cited in the discussion of topical issues where appropriate.

B. In general, a Negative Declaration shall be prepared for a project subject to CEQA when either the Initial Study demonstrates that there is no substantial evidence that the project may have one or more significant effects on the environment. A Negative Declaration shall also be prepared if the Initial Study identifies potentially significant effects, but revisions to the project made by or agreed to by the applicant prior to release of the Negative Declaration for public review would avoid or reduce such effects to a level of less than significance, and there is no substantial evidence before the Lead County Department that the project as revised will have a significant effect on the environment. A signature block is provided in Section VII of this Initial Study to verify that the project sponsor has agreed to incorporate mitigation measures into the project in conformance with this requirement.

C. All answers to the topical questions must take into account the whole of the action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts. Significant unavoidable cumulative impacts shall be identified in Section VI of this Initial Study (Mandatory Findings of Significance).

D. A brief explanation shall be given for all answers except "Not Applicable" answers that are adequately supported by the information sources the Lead County Department cites in the parenthesis following each question. A "Not Applicable" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "Not Applicable" answer shall be discussed where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

E. "Less-than-significant Impact" is appropriate if an effect is found to be less-than-significant based on the project as proposed and without the incorporation of mitigation measures recommended in the Initial Study.

F. "Potentially Significant Unless Mitigated" applies where the incorporation of recommended mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less-than-significant Impact." The Lead County Department must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from Section V, "Earlier Analyses", may be cross-referenced).

F. "Significant Impact" is appropriate if an effect is significant or potentially significant, or if the Lead County Department lacks information to make a finding that the effect is less-than-significant. If there are one or more effects which have been determined to be significant and unavoidable, an EIR shall be required for the project.

G. The answers in this checklist have also considered the current California Environmental Quality Act Guidelines and the Initial Study Checklist contained in those Guidelines.

H. This Initial Study checklist was prepared consistent with current California Environmental Quality Act Guidelines and the Initial Study checklist contained in those Guidelines.

V. ISSUES *(for source #(s) see: Documents Included by Reference; Page 13)*

1. **LAND USE AND PLANNING.** ***Would the proposal:***

a) **Conflict with applicable Countywide Plan designation or zoning standards? (source #(s): 1, 2)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The determinations of policy consistency as discussed in this Initial Study section represent County staff interpretation of policies. However, this Initial Study does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

Section 15358(b) of the CEQA Guidelines states that "effects analyzed under CEQA must be related to a physical change in the environment", however policy inconsistencies may not necessarily indicate significant environmental effects Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environment are considered significant impacts pursuant to CEQA. Where potentially significant environmental impacts are raised in the discussion below, they have been mitigated to a less-than-significant impact and, therefore, project activities are determined to be consistent with the relevant policies cited. Mitigations are addressed further in the topical impact sections following the plan, policies and regulations analyses.

LOCAL PLANS, POLICIES, AND REGULATIONS

Land use designations and development of the project sites are governed by the objectives and policies of the 2007 Marin Countywide Plan (CWP), sections of the Marin County Code, including Title 22 (Zoning) and Title 23 (Natural Resources) and Title 24 (Development Standards). And General Plans for local municipal program partners including; City of Novato, City of Mill Valley, Town of Ross, City of Larkspur, Town of San Anselmo and the Town of Fairfax.

MARIN COUNTY CODE

TITLE 22- DEVELOPMENT CODE; Chapter 22.27- Native Tree Protection and Preservation

Section 22.27.040 (k)- Exemption to the Prohibition of Removal of a Protected Tree states that the project proponent must demonstrate that the tree removal is by a public agency to provide for the routine management and maintenance of public land.

Consistent- The project is consistent with the Marin County Code (Title 22) which requires projects to minimize tree removal and grading, as well as to maintain adequate site features that establish the visual character of the site. Marin County Flood Control District during RMA Program implementation, will minimize any riparian tree removal unless absolutely necessary to achieve the goals of the program, which are to protect the public and public facilities from flooding, while protecting water quality and sensitive habitats. To protect sites that are environmentally sensitive, the District will employ a suite of Avoidance and Minimization Measures and Best Management Practices to protect existing habitats and species of concern. Therefore, the project is consistent with the development standards set forth in Title 22.

TITLE 23- NATURAL RESOURCES;

The provisions of Title 23 are enacted to protect and promote the public health, safety and general welfare, to preserve environmental qualities, and to protect the value, worth and enjoyment of the use of real property to the fullest extent possible, through the regulation of the uses or activities of the property in a manner which will prevent serious public injury.

Chapter 23.08 Excavating, Grading, and Filling
Chapter 23.08 establishes regulations for excavation, grading and filling in order to:

(1) Preserve and enhance the natural beauties of the land, streams, bays and shorelines;
(2) Reduce or eliminate the hazards of earth slides, mudflows, rock falls, undue settlement, erosion, siltation, sedimentation and flooding;
(3) Protect and enhance the water quality of watercourses, water bodies and wetlands and vegetation for wildlife habitat;
(4) Regulate de facto development caused by uncontrolled grading.

Activities of this nature which are considered exempt from the provisions of this chapter include:
(a) Grading done by or on behalf of a public agency that assumes full responsibility for the work.

Consistent: The project as described will be implemented by the County of Marin Flood Control District, local municipalities or private contractors under contract with the District. The District is a public agency and assumes full responsibility for the work conducted under the RMA program, therefore the program is exempt from the terms of Chapter 23.08, and consistent with the requirements of this section of County code.

Chapter 23.09 Floodplain Management
It is the purpose of Chapter 23.09 to promote the public health, safety and general welfare and to minimize the losses described in this section by provisions designed to:

(A) Protect human life and health;
(B) Minimize expenditure of public money for flood control projects;
(C) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
(D) Minimize prolonged business interruptions;
(E) Minimize damage to public facilities and utilities, such as water located in areas of special flood hazard;
(F) Help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
(G) Ensure that potential buyers are notified that property is in an area of special flood hazard; and
(H) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

(2) In order to accomplish its purposes, Chapter 23.09 includes methods and provisions for:

(A) Restricting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
(B) Requiring that uses vulnerable to flood, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
(C) Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
(D) Controlling filling, grading, dredging and other development which may increase flood damage; and
(E) Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Consistent- The project is consistent with the Marin County Code Title 23 which was enacted to protect and promote the public health, safety and general welfare, and to preserve environmental qualities in a manner which would prevent serious public injury. The objective of the project is to promote flood control and minimize risk to public health, safety and welfare. The program as designed will minimize potential impacts to sensitive habitats and will be designed to blend into the surrounding natural environment to the greatest extent feasible. The proposed flood control project incorporates practices which enhance the biological and visual character of the creek corridor. Although some trimming of riparian trees will occur to prevent flooding, the project will not alter the riparian character of the project sites. The implementation of the proposed program will respect the surrounding natural environment and return channel elevations to their previous condition prior to sedimentation.

In summary, the proposed project is maintenance in nature, and will not change the Land Use Designations at the project sites or conflict with zoning standards or the objectives of the above-mentioned code in any way; therefore, the project will be consistent with applicable Marin County Code.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Conflict with applicable environmental plans or policies adopted by Marin County? (source #(s): 1)	[ ]	[X]	[ ]	[ ]

MARIN COUNTYWIDE PLAN (2007)

Specific Countywide Plan policies which pertain to the proposed project are associated with the following subjects:

(1) Include Resource Preservation in Environmental Review;
- BIO- 2.1 Include Resources Protection in Environmental Review

(2) Coordinate with Trustee Agencies and Promote Early Consultation with Agencies;
- BIO-2.8 Coordinate with Trustee Agencies during environmental review when special-status species, sensitive natural communities, or wetlands may be affected.
- BIO-2.9 Promote early consultation with other agencies.

(3) Protection of Riparian Systems
- BIO-1.5 Promote Use of Native Plant Species

- BIO-1.7 Remove Invasive Exotic Plants
- BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials
- BIO-4.6 Control Exotic Vegetation
- BIO-4.7 Protect Riparian Vegetation

(4) Protection of Stream Conservation Areas
- BIO- 4.4 Promote Natural Stream Channel Function
- BIO-4.5 Restore and Stabilize Stream Channels
- BIO-4.10 Promote Interagency Cooperation
- BIO-4.19 Maintain Channel Stability

(5) Species and Habitat Preservation
- BIO-1.1 Protect Wetlands, Habitat for Special -Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors.
- BIO-1.3 Protect Woodlands, Forests, and Tree Resources
- BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors.
- BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season
- BIO-2.7 Protect Sensitive Coastal Habitat.
- BIO-5.3 Leave Tidelands in the Natural State
- BIO-5.5 Protect Freshwater Habitats
- BIO-5.6 Use Flood Basins for Seasonal Habitat

(6) Protection of Watersheds and Water Quality
- WR-1.1 Protect Watersheds and Aquifer Recharge
- WR-2.3 Avoid Erosion and Sedimentation
- WR-2.4 Design County Facilities to Minimize Pollutant Input

(7) Avoidance of Environmental Hazards
- EH-2.1. Avoid Hazard Areas
- EH-3.2. Retain Natural Conditions
- EH-4.1. Limit Risks to Structures
- EH-4.2 Remove Hazardous Vegetation

(8) Protection of Air Quality
- AIR-2.0 Protection from Emissions
- AIR-5.0 Adaptation to Climate Change

(9) Minimize Noise Impacts;
- NO-1.3 Regulate Noise Generating Activities

(10) Protection of Visual Resources
- DES-4.1. Preserve Visual Quality

(11) Avoid Impacts to Historical Resources;
- HAR-1.3. Avoid Impacts to Historical Resources

CONSISTENCY OF PROJECT WITH EXISTING MARIN COUNTYWIDE PLAN POLICIES

(1) Include Resource Preservation in Environmental Review

BIO-2.1 Include Resource Preservation in Environmental Review *to assess the impact of proposed development on native species and habitat diversity, particularly special-status species, sensitive natural communities, wetlands, and important wildlife nursery areas and movement corridors. Require adequate mitigation measures for ensuring the protection of any sensitive resources and achieving "no net loss" of sensitive habitat acreage, values, and functions.*

Consistent: The Marin County Department of Public Works (DPW) developed a biological assessment for the RMA program which evaluated potential impacts to native species, habitat diversity and special-status species and natural communities (Biological Assessment for Routine Flood Control Maintenance Activities; July 2011). The objective of the biological assessment was to identify adequate measures to protect any sensitive resources and achieve "no net loss" of sensitive habitat acreage, values, and functions. Prescriptions contained in the Biological Assessment include species related Avoidance and Minimization Measures as well as Special Conditions and Best Management Practices to be employed during project implementation. The project is guided by these prescriptions from the Biological Assessment so therefore, the project will be consistent with Policy BIO-2.1.

(2) Coordinate with Trustee Agencies and Promote Early Consultation with Other Agencies

BIO-2.8 Coordinate with Trustee Agencies. *Consult with trustee agencies (the California Department of Fish and Game, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration (NOAA) Fisheries, U.S. Army Corps of Engineers, Environmental Protection Agency, Regional Water Quality Control Board, and Bay Conservation and Development Commission) during environmental review when special-status species, sensitive natural communities, or wetlands may be adversely affected.*

BIO-2.9 Promote Early Consultation with Other Agencies. *Require applicants to consult with all agencies with review authority for projects in areas supporting wetlands and special-status species at the outset of project planning.*

Consistent: DPW has coordinated the development and review of this project and its associated environmental documents with natural resource trustee agencies who require permits for the proposed work. Permitting agencies include the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), the California Department of Fish and Game for all sites. A select number of sites will need permits from the U.S. Army Corps of Engineers with consultation with U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. Regulatory permit applications have been submitted to all these agencies. Project coordination with these regulatory agencies and notification to all interested parties and the general public will continue throughout the public review process. Therefore, the project is consistent with Policies BIO-2.8 and BIO-2.9.

(3) Protection of Riparian Systems

BIO-1.5 Promote Use of Native Plant Species. *Encourage use of a variety of native or compatible non-native, non-invasive plant species indigenous to the site vicinity as part of project landscaping to improve wildlife habitat values.*

BIO-1.7 Remove Invasive Exotic Plants. *Require the removal of invasive exotic specie, to the extent feasible, when considering applicable measures in discretionary permit approvals for development projects unrelated to agriculture, and include monitoring to prevent re-establishment in managed areas.*

BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials. *Encourage the use of integrated pest management and organic practices to manage pest with the least possible hazard to the environment. Restrict the use of insecticide, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared; the habitat itself is threatened; a substantial risk to public health and safety exists, including maintenance for flood control; or such use is authorized pursuant to a permit issues by the agricultural commissioner. Encourage non-toxic strategies for pest control, such as habitat management using physical and biological control, as an alternative to chemical treatment, and allow use of toxic substances only after approaches have been tried and determines unsuccessful. Continue to implement the Integrated Pest Management ordinance for county-related operations.*

BIO- 4.6 Control Exotic Vegetation. *Remove and replace invasive exotic plants with native plants as part of stream restoration projects and as a condition of site-specific development approval in than SCA and include monitoring to prevent reestablishment.*

BIO-4.7 Protect Riparian Vegetation. *Retain riparian vegetation for stabilization of stream banks and floodplains, moderating water temperatures, trapping and filtering sediments and other water pollutants, providing wildlife habitat, and aesthetic reasons.*

Consistent: Vegetation management activities are employed to achieve three main goals: maintain channels, reduce fire fuels, and restore creek habitat by removing invasive non-native plants and re-vegetating with native plants. Maintaining channel function is achieved by limbing and trimming, cattail cutting, removing vegetation from channel bottoms, and clearing trash. These activities occur from the channel bottom to the top of the high water mark, and include trimming tree limbs from trees and shrubs growing in the channel and trimming branches that hang down into the active channel. These activities employ vegetation control methods such as cutting and removing vegetation above the ground by hand or with loppers, hand saws, chainsaws, pole saws, weed eaters and other hand tools. Bladed weed-eaters are used to cut cattails. Fire fuel reduction is achieved by mowing on tops of banks and levees, removal of fallen trees, removal of standing dead trees, and thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas. Tree removal and thinning employ a mix of tools including chainsaws, loppers, hand saws, pole saws, hedge trimmers, and other hand tools.

Tree removal is a rare event. Program BIO-4f of the Countywide Plan recognizes that tree growth may be cleared from the stream channel where removal is essential to protect against property damage or prevent safety hazards Removal of mature, healthy, native trees is only indicated when pruning is insufficient to reduce unacceptably high hydraulic roughness in the channel. For example, an arroyo willow growing on a newly established gravel bar may need to be removed if it threatens to block flow through a structure. Removal of sick, dying, or dead trees is indicated when they reduce channel capacity, increase flood hazard, and/or are a safety hazard to adjacent structures. Tree health and hazard potential will be determined by appropriate environmental staff (arborist or biologist). Snags shall be left in place to provide habitat for birds and small mammals if they do not otherwise pose a flood or safety hazard. Staff will consult with CDFG whenever possible if tree removal is necessary, and retention of large wood debris in the creeks will follow CDFG protocols.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program. Since 1999 STRAW has restored 7,159 linear feet (5.9 acres) of riparian corridor along east Marin creeks, removing invasive non-native plants and revegetating with natives to restore streamside habitat. The STRAW Program is included as a partner in the Marin County Flood Control District's Routine Maintenance Program (RMA).

Overall, the vegetation removal within flood control creeks and drainages will be the minimum amount necessary to clear these areas of obstructions. As discussed in detail in Sections V. 7, the proposed project will adhere to the mitigation measures outlined in that section, ensuring that the project would have less-than-significant impacts on riparian systems or the plants and animals that inhabit the riparian zone. Therefore, the project has been mitigated to consistency with Policies BIO-1.5, BIO-1.7, BIO-1.8, BIO-4.6 and BIO-4.7.

(4) Protection of Stream Conservation Areas

BIO-4.1 Restrict Land Use in Stream Conservation Areas. *A Stream Conservation Area (SCA) is established to protect the active channel, water quality and flood control functions, and associated fish and wildlife habitat values along streams. Development shall be set back to protect the stream and provide an upland buffer, which is important to protect significant resources that may be present and provide a transitional protection zone. Best management practices shall be adhered to in all designated SCAs. Best management practices are also strongly encouraged in ephemeral streams not defined as SCAs.*

Allowable uses in SCAs in any corridor consist of the following, provided they conform to zoning and all relevant criteria and standards for SCAs, as follows:

- Existing permitted or legal nonconforming structures or improvements, their repair, and their retrofit within the existing footprint;
- Projects to improve fish and wildlife habitat;
- Driveway, road and utility crossings, if no other location is feasible;
- Water monitoring installations;
- Passive recreation that does not significantly disturb native species;
- Necessary water supply and flood control projects that minimize impacts to stream function and to fish and wildlife habitat;
- Agricultural uses that do not result in any of the following:
  a. The removal of woody riparian vegetation;
  b. The installation of fencing within the SCA that prevents wildlife access to the riparian habitat within the SCA;
  c. Animal confinement within the SCA; and
  d. A substantial increase in sedimentation.

BIO-4.4 Promote Natural Stream Channel Function*. Retain and, where possible, restore the hydraulic capacity and natural functions of stream channels in SCAs. Discourage alteration of the bed or banks of the stream, including filling, grading, excavating, and installation of storm drains and culverts. When feasible replace impervious surfaces with pervious surfaces. Protect*

and enhance fish habitat, including through retention of large woody debris, except in cases where removal is essential to protect against property damage or prevent safety hazards. In no case shall alterations that create barriers to fish migration be allowed on streams mapped as historically supporting salmonids. Alteration of natural channels within SCAs for flood control shall be designed and constructed in a manner that retains and protects the riparian vegetation, allows for sufficient capacity and natural channel migration, and allows for reestablishment of woody trees and shrubs without compromising the flood flow capacity where avoidance of existing riparian vegetation is not possible.

***BIO- 4.5 Restore and Stabilize Stream Channels**. Pursue stream restoration and appropriate channel redesign where sufficient right-of-way exists that includes the following: a hydraulic design, a channel plan form, a composite channel cross-section that incorporates low flow and bankfull channels, removal and control of invasive exotic plant species, and bio-technical bank stabilization methods to promote quick reestablishment of riparian trees and other native vegetation.*

***BIO-4.10 Promote Interagency Cooperation.** Work in close cooperation with flood control districts, water districts, and wildlife agencies in the design and choice of materials for construction and alterations within SCAs.*

Consistent: Many of the channels included in the project areas are subject to protection under the Stream Conservation Area protection policies as set forth in the Countywide Plan. As discussed in Section V. 3. (c) And V. 11. (d, e), the proposed project is a flood control project that will maintain functioning channels for conveyance of water flow, minimize impacts to fish and wildlife habitat and reduce risk of fire and flooding. Thus, it is a permitted activity within the SCA, as set forth in the Countywide Plan Policy BIO-4.1 Excavation of accumulated sediment, selective vegetation removal within the creeks, channels and drainage ditches at the project sites, and minimal streambank stabilization where needed will work to restore the hydraulic and natural functions of project drainages to reduce the risk of flooding, thus the project is consistent with Polices BIO-4.4 and 4.5. The project promote interagency cooperation in that it will be implemented by the Marin County Flood Control District in collaboration with local municipalities including the Cities of Mill Valley, Larkspur, Ross, San Anselmo, Fairfax and Novato. Permits for the project will be issued by the trustee agencies including the Department of Fish and Game, the US Army Corps of Engineers, the Regional Water Quality Control Board, the US Fish and Wildlife Service and the National Marine Fisheries Service.

(5) Species and Habitat Preservation

***BIO-1.1 Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors**. Protect sensitive biological resources, wetlands, migratory species of the Pacific Flyway, and wildlife movement corridors through careful environmental review of proposed development applications, including consideration of cumulative impacts, participation in comprehensive habitat management programs with other local and resource agencies, and continue acquisition and management of open space lands that provide for permanent protection of important natural habitats.*

***BIO-1.3 Protect Woodlands, Forests, and Tree Resources**. Protect large native trees, trees with historical importance; oak woodlands; healthy and safe eucalyptus groves that support colonies of monarch butterflies, colonial nesting birds, or known raptor sites; and forest habitats. Prevent the untimely removal of trees through the implementation of standards in the Development Code and*

Native Tree Preservation and Protection Ordinance. Encourage other local agencies to adopt tree preservation ordinances to protect native trees and woodlands, regardless of whether they are located in urban or undeveloped areas

BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors. *Ensure that important corridors for wildlife movement and dispersal are protected as a condition of discretionary permits, including consideration of cumulative impacts. Features of particular importance to wildlife for movement may include riparian corridors, shorelines of the coast and bay, and ridgelines. Linkages and corridors shall be provided that connect sensitive habitat areas such as woodlands, forests, wetlands, and essential habitat for special-status species, including an assessment of cumulative impacts.*

BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season. *Limit construction and other sources of potential disturbance in sensitive riparian corridors, wetlands, and baylands to protect bird nesting activities. Disturbance should generally be set back from sensitive habitat during the nesting season from March 1 through August 1 to protect bird nesting, rearing, and fledging activities. Pre-construction surveys should be conducted by a qualified professional where development is proposed in sensitive habitat areas during the nesting season, and appropriate restrictions should be defined to protect nests in active use and ensure that any young have fledged before construction proceeds.*

BIO-2.7 Protect Sensitive Coastal Habitat.. *Protect coastal dunes, streams, and wetlands, and sensitive wildlife habitat from development in accordance with coastal resource management standards in the development code.*

BIO-5.1 Protect the Baylands Corridor. *Ensure that baylands and large, adjacent essential uplands are protected, and encourage enhancement efforts for baylands, including those in the baylands corridor.*

BIO-5.3 Leave Tidelands in Their Natural State. *Require that all tidelands be left in their natural state to respect their biological importance to the estuarine ecosystem. Any modifications should be limited to habitat restoration or enhancement plans approved by regulatory agencies.*

BIO-5.5 Protect Freshwater Habitats. *Preserve and where possible expand habitats associated with freshwater streams, seasonal wetlands, and small former marshes to facilitate the circulation, distribution, and flow of fresh water, and to enhance associated habitat values.*

BIO-5.6 Use Flood Basins for Seasonal Habitat. *Utilize natural or manage man-made flood basins to provide seasonal habitat for waterfowl and shorebirds and prohibit development in these basins to protect habitat values.*

Consistent: A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the project's potential impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Avoidance and Minimization Measures (AMMs) to be employed at each project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

General and activity-specific conditions, AMMs and BMPs are incorporated into the overall RMA project description and spelled out in the individual project fact sheets for each site. An Environmental Compliance Coordinator (ECC) will work with the project on a daily basis to ensure that all AMMs and BMPs are implemented as prescribed in the field, depending on the location and nature of the activity. The ECC will be on-site to monitor the outcome of all conservation measures to assure protection of all fish and wildlife species and their habitats

As prescribed in the Biological Assessment, pre-construction surveys for special-status animal and plant species will be completed at individual sites as necessary depending on work windows and seasonal conditions. If surveys confirm species occurrence at a project site, a biologist will oversee all construction work and implement appropriate conservation measures to protect these species. If necessary, avoidance of work areas and stop work orders will be employed if impacts to sensitive species and their habitat cannot be mitigated to a less-then-significant level or avoided completely. As discussed in detail in Sections V. 7. (a, b, c), the proposed project, will adhere to the mitigation measures outlined in those sections, ensuring that the project would have less-than-significant impacts on all special-status species, wildlife and habitat diversity. Therefore, the project has been mitigated to consistency with Policies BIO-1.1, BIO-1.3, BIO-2.4, BIO-2.5, BIO-2.7.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program. Since 1999 STRAW has restored 7,159 linear feet (5.9 acres) of riparian corridor along east Marin creeks, removing invasive non-native plants and revegetating with natives to restore streamside habitat. The STRAW Program is included as a partner in the Marin County Flood Control District's Routine Maintenance Program (RMA).

Sensitive natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection (i.e., §404 of the Clean Water Act and/or the §§1600 et seq. of the California Fish and Game Code). Within the project sites, two sensitive natural communities have the potential to be affected by project activities: northern coastal salt marsh and coastal brackish marsh (CDFG 2011). These communities are found within or adjacent to some of the project sites and are expected to fall under federal and/or state jurisdictions as wetlands or waters of the U.S. or waters of the state. Wetlands and Other Waters of the U.S. Wetlands and other aquatic resources such as riparian areas and certain aquatic vegetation communities are considered sensitive biological resources and can fall under the jurisdiction of several regulatory agencies. Wetlands are generally defined by the USACE as "those areas that are inundated or saturated by surface or ground water... that under normal circumstances support a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 [b]). Indicators of three wetland parameters determined by field investigation must be present for a site to be classified as a wetland by the USACE; these are hydric soils, hydrophytic vegetation, and wetlands hydrology. Approximately one third of the sites have been initially identified as possibly meeting the USACE definition of wetlands. A formal wetlands delineation for those 38 sites will be completed in Spring or Summer 2012. Mitigation measures to protect these sites are outlined in Section 7 below. In tideland areas maintenance work will be limited to that which is absolutely necessary to restore flow through to the tidelands from upland drainage areas (e.g. clearing sediment from culvert outfalls). The minimal amount of work proposed in the tidelands area will be conditioned by permits issued by the Department of Fish and Game (1600 Streambed Alteration Agreement) and the Army Corps of Engineers (404 permit), with consultation from US Fish and

Wildlife Service the National Marine Fisheries Service, and the Regional Water Quality Control Board (401 Certification). General and activity-specific conditions, AMMs and BMPs prescribed for all project sites located in tideland areas will mitigate the project's impacts to less-than-significant, therefore, the project will be consistent with Policies BIO-5.1, BIO-5.3, BIO-5.5, and BIO-5.6.

(6) Protection of Watersheds and Water Quality

WR-1.1. Protect Watersheds and Aquifer Recharge. *Give high priority to the protection of watersheds, aquifer-recharge areas, and natural drainage systems in any consideration of land use.*

WR-2.3. Avoid Erosion and Sedimentation. *Minimize soil erosion and discharge of sediments into surface runoff, drainage systems, and water bodies. Continue to require grading plans that address avoidance of soil erosion and on-site sediment retention. Require developments to include on-site facilities for the retention of sediments, and, if necessary, require continued monitoring and maintenance of these facilities upon project completion.*

WR-2.4 Design County Facilities to Minimize Pollutant Input. *Design, construct, and maintain County building, landscaped areas, roads, bridges, drainages, and other facilities to minimize the volume of toxic, nutrients, sediment, and other pollutants in stormwater flows, and continue to improve road maintenance methods to reduce erosion and sedimentation potential.*

Consistent: Implementation of this project will help to restore the normal drainage patterns within the project area by removing accumulated sediment from the creeks, channels and drainage ditches at selected sites. There will be a temporary increase in turbidity in these drainages as sediment is disturbed from the dredging process. These impacts will be short-term and localized over the 1-7 day sediment removal project period. DPW will use Best Management Practices (BMPs) outlined in the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance. These BMPs include minimizing loss of native vegetation, conducting the work from the road whenever possible, timing the work prior to the rainy season, minimizing sediment disturbance and suspension within the water, taking all excavated material to an upland disposal site, and sediment/erosion controls to keep excess soil from washing or blowing away during removal, transport and storage (including sediment traps, silt fences, coir logs and wattles containing weed-free rice straw, as necessary). Dewatering will be conducted in a manner to reduce turbidity downstream of the project area. To prevent streambed erosion from the use of cofferdams, pipes and pumps used to de-water the creek, diversion pipe outlets shall be placed on hard surfaces or temporary outfall dissipation structures shall be installed (i.e. rock piles). No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start-up of any phase of the project that may result in sediment run-off to the stream. If rainfall is predicted, erosion control measures must be kept on-site and be in place prior to the onset of precipitation. As discussed in detail in Sections V. 3. (b) and V. 4. (c), the proposed project will adhere to the mitigation measures outlined in those sections, ensuring that the project would have less-than-significant impacts on water quality and watersheds. Therefore, the project has been mitigated to consistency with Policies WR-1.1, 2.3 and 2.4.

(7) Avoidance of Environmental Hazards

EH-2.1. Avoid Hazard Areas. *Require development to avoid or minimize potential hazards from earthquakes and unstable ground conditions.*

EH-3.2. Retain Natural Conditions. *Ensure that flow capacity is maintained in stream channels and floodplains, and achieve flood control using biotechnical techniques instead of storm drains, culverts, riprap, and other forms of structural stabilization.*

EH-4.2 Remove Hazardous Vegetation. *Abate the build-up of vegetation around existing structures or on vacant properties that could help fuel fires.*

Consistent: The RMA project is maintenance in nature and no new development or increases of footprint of existing development is proposed; therefore no increase in impacts from an earthquakes on structures is predicted for the project. This project will restore the channel function of these drainages by removing obstructing vegetation and accumulated sediment, which should reduce the potential for flooding of adjacent roadways and promote public safety of people and property from the risks associated with flooding. The proposed bank stabilization associated with the RMA uses biotechnical designs and does not include installation of rip rap or other forms of structural stabilization. Bank stabilization and channel clearing activities will be implemented in a way that maintains natural channel features and watershed functions. Mowing of levees and along top of bank in selected channel reaches is done before the July 4th holiday in order to reduce fire fuel loading and to minimize the risk of grass fires, therefore, the project will be consistent with Policies EH-2.1, 3.2 and 4.2.

(8) Protection of Air Quality

AIR-2.0. Protection from Emissions. *Minimize the potential impacts from land uses that may emit pollution and/or odors on residential and other land uses sensitive to such emissions in unincorporated Marin County.*

AIR-5.0 Adaptation to Climate Change- Adopt policies and programs that promote resilient human and natural systems in order to ease the impacts of climate change.

Consistent: The effects on air quality are from exhaust coming from heavy equipment during dredging. These impacts are short-term and temporal, occurring incrementally over the 1-7 day work periods. As discussed in Section V. 5.(a), the project would contribute minimally to air impacts; no significant negative impacts related to air quality are identified. The re-vegetation of stream banks by the STRAW program serves to sequester carbon and thus reduce the impacts of climate change. Consequently, the proposed project will be consistent with Policy AIR-2.1.

(9) Protection of Open Space and Trails

Policy TRL-1.1. Protect the Existing Countywide Trail System. *Maintain the existing countywide trail system and protect the public's right to access it.*

Consistent: The project will not impede access to the Countywide Trail System in any way nor will it create any impacts that will decrease the public's enjoyment of the trail system or open space areas in any way, therefore it is consistent with the Countywide Plan Policies to protect open space and trails.

(10) Minimize Noise Impacts

NO-1.3. Regulate Noise Generating Activities. *Require measures to minimize noise exposure to neighboring properties, open space, and wildlife habitat from construction-related activities, yard maintenance equipment, and other noise sources, such as amplified music.*

Consistent: As discussed in Section V. 10. (a, b), the noise associated with sediment removal activities is limited to the sound of heavy equipment operating during normal daytime working hours (approximately 8:00 a.m. to 4:00 p.m.). The project is short-term (approximately 1-7 days, depending on site), most of the work is not near residences and for those that are, private landowners have concurred with implementation of this flood control maintenance project on their lands and project dates will be coordinated with these landowners in advance of project commencement. Noise impacts could cause temporary disturbance to wildlife species such as songbirds that use the riparian zone. Any disturbed or flushed resident wildlife are expected to return to the project area after completion of daily construction activities. The project would contribute minimally to noise impacts; no significant impacts related to noise pollution are identified. Therefore, the project will be consistent with Policy NO-1.3.

(11) Protection of Visual Resources

DES-4.1. Preserve Visual Quality *Protect scenic quality and views of the natural environment – including ridgelines and upland greenbelts, hillsides, water, and trees – from adverse impacts related to development.*

Consistent: The visual resources of the project sites would not be adversely impacted by maintenance activities because the overall project is designed to respect the surrounding natural environment and return it to its previous condition (i.e., by removing aggraded sediment, fallen trees or overgrown weeds). Some trimming of riparian trees will occur, but the maintenance project would not result in visual impacts to public or scenic views and vistas from adjacent roadways, therefore, the project will be consistent with Policy DES-4.1.

(12) Avoid Impacts to Historical Resources

HAR-1.3. Avoid Impacts to Historical Resources. Ensure that human activity avoids damaging cultural resources.

Consistent: As discussed in Sections V. 14. (a, b), the proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and some sites to be dredged have previously been dredged multiple times in the same locations. Should any cultural resources be discovered during sediment removal activities, all work shall immediately be stopped and the services of a qualified archaeologist from Sonoma State University's Cultural Resources Department shall be engaged to assess the value of the resource and to develop appropriate mitigation measures. As discussed in detail in Sections V. 14. (a), the proposed project will adhere to the mitigation measures outlined in that section, ensuring that the project would have less-than-significant impacts on historical resources. Therefore, the project has been mitigated to consistency with Policy HAR-1.3.

CITY OF MILL VALLEY GENERAL PLAN (1989)

Section 5: Public Health and Safety; PH-1: The City shall strive to ensure that all grading, site improvements and structures minimize geotechnical, seismic and flood hazards to people and property.

A large portion of developed and undeveloped Mill Valley lands are subject to flooding due to a combination of factors including periodic heavy winter rainfalls, tidal fluctuations, and potentials for tsunami and dam failure due to seismic activity. Flooding as a result of heavy rainfall can result from either of two phenomena: (1) storm water run-off inundation of lowlands due to an inadequate drainage network, and (2) high Bay tides and winds which force the storm water up stream channels. Mill Valley drains into the Richardson Bay Drainage Basin mainly by way of the Basin's major stream, Arroyo Corte Madera Del Presidio. The creek often overflows its banks in the lower reaches during a period of heavy rainfall. Significant encroachment has occurred along Arroyo Corte Madera by urban development and excessive vegetative growth. Both factors have imposed extreme limitations on channel flow capacities along substantial portions of the stream, resulting in major flood problems. Damaging floods have periodically occurred over this area as a result.

Consistent: The primary objective of the proposed RMA project within the City of Mill Valley's jurisdiction is to reduce the potential risk of flooding by maintaining the channels and removing obstructions from related flood control infrastructure such as tidegates, weirs and trash racks; therefore the RMA program is consistent with the PH-1 Policy of the City of Mill Valley General Plan.

CITY OF NOVATO GENERAL PLAN (1996)

The City of Novato General Plan contains the following policies to protect Watercourses, Wetlands, and Baylands Areas that are applicable to the proposed RMA activities that will be conducted on properties within the City of Novato jurisdiction.

CHAPTER IV- Environment; Watercourses, Wetlands, and Baylands Areas

EN Objective 1– Preserve, protect, and enhance streams and other bodies of water.

EN Policy 1 Ecology of Creeks and Streams. *Preserve and enhance the ecology of creeks and streams.*

EN Policy 2 Vegetation in Watercourse Areas. *Protect vegetation in watercourse areas.*

EN Policy 3 Wildlife Habitat. *Endeavor to preserve and enhance wildlife habitat areas in watercourse areas and control human use of these areas as necessary to protect them.*

EN Policy 4 Erosion Control. *Minimize soil disturbance and surface runoff in the Stream Protection Zones. Pursuant to the City's grading ordinance, work in and adjacent to the zones shall be conducted during the dry season only, at times when the Community Development Department determines that surface runoff will be minimal or containable.*

EN Policy 5 Habitat Restoration. *Restore damaged portions of riparian areas to their natural state, wherever feasible.*

EN Policy 7 Water Quality. *Encourage protection of water resources from pollution and sedimentation, and preserve their environmental and recreation values. count the project's size and cumulative impacts.*

EN Policy 8 Environmentally Sound Flood Control Measures. *Encourage flood control measures that retain the natural features and conditions of watercourses to the maximum feasible extent.*

EN Objective 2- Preserve, protect, and enhance wetlands.

EN Policy 9 Determination of Wetlands. *Recognize the U.S. Army Corps of Engineers (ACE) as the designated permitting agency that regulates wetlands. In regulating wetland activities, the ACE consults with other agencies and organizations including but not limited to U.S. Fish and Wildlife and State Department of Fish and Game.*

EN Policy 10 Wetlands Ecology*. Preserve and enhance wetlands ecology.*

EN Objective 3- Preserve, protect and enhance historic bayland areas.

EN Policy 12 Bayland Area Protection. *Regulate development in the Bayland Overlay Zone so that it does not encroach into wetlands or sensitive wildlife habitats, provided that this regulation does not prevent all use of a property. Discourage human activity that damages fisheries, or habitat for birds, fish or other wildlife.*

EN Objective 4 - Preserve and protect native plant and animal species and their habitat.

EN Policy 18 Species Diversity and Habitat. *Protect biological resources that are necessary to maintain a diversity of plant and animal species.*

EN Policy 19 Special Status Species. *Cooperate with State and Federal Agencies to ensure that development does not substantially adversely affect special status species appearing on the State or Federal list for any rare, endangered, or threatened species. The environmental documentation will screen for the Federal Candidate Species, plants listed on lists 1A, 1B, or 2 of the California Native Plant Society (CNPS), inventory of rare and endangered vascular plants of California and animals designated by CDFG as species of special concern or their current equivalent.*

CHAPTER V- Safety and Noise

SF Objective 3- Reduce flood hazards.

SF Policy 6 Cooperation with Marin County. *Continue to work with the Marin County Public Works Department to minimize negative impacts of storm runoff.*

SF Policy 8 Reducing Flood Hazards*. Reduce flood risk by maintaining effective flood drainage systems and regulating construction.*

SF Policy 9 Storm Drainage System. *Maintain unobstructed water flow in the storm drainage system.*

Consistent: The proposed project is consistent with City of Novato General Plan policies listed above, since the primary objective of the RMA project is to reduce the potential risk and hazards

associated with flooding and to maintain unobstructed flow in the storm drainage systems. During all RMA activities Avoidance and Minimization Measures and BMPs will be implemented to protect and enhance the streams and wetlands within the project area and native habitat found within these systems. Therefore the RMA program is consistent with the Policies EN 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 18, and 19 and SF 6, 8 and 9.

LAND USE AND PLANNING Section 1- (*continued...*)

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Affect agricultural resources, operations, or contracts (e.g. impacts to soils or farmlands, impacts from incompatible land uses, or conflicts with Williamson Act contracts)? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not change any agricultural resources, operation or contracts; therefore this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
d) Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not divide or affect the physical arrangement of the established communities; therefore this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
e) Result in substantial alteration of the character or functioning of the community, or present or planned use of an area? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not alter the character or function of the community and will actually be a benefit to the community by reducing the potential frequency of flooding; therefore, the project will result in less-than-significant impacts.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
f) Substantially increase the demand for neighborhood or regional parks or other recreational facilities, or affect existing recreational opportunities? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not increase demand for parks or other facilities, therefore this is a less-than-significant impact.

2. POPULATION AND HOUSING. *Would the proposal:*

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Increase density that would exceed official population projections for the planning area within which the project site is located as set forth in the Countywide Plan and/or community plan? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not have an effect on population nor density of housing; therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or extension of major infrastructure)? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not have an effect on growth of an area either directly or indirectly; therefore the project will result in less-than-significant impacts.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Displace existing housing, especially affordable housing? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not displace existing housing of any kind; therefore, the project will result in a less-than-significant impact.

3. GEOPHYSICAL. *Would the proposal result in or expose people to potential impacts involving:*

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Location in an area of geologic hazards, including but not necessarily limited to: 1) active or potentially active fault zones; 2) landslides or mudslides; 3) slope instability or ground failure; 4) subsidence; 5) expansive soils; 6) liquefaction; 7) tsunami ; or 8) similar hazards? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

This is a routine flood control maintenance project, which will not result in the building of any structures, not increase the vulnerability of other structures to geologic hazards, nor diminish stability of structures within the project area. Rather, the maintenance activities will add to the protection of the public and public infrastructure from potential geologic hazards by increasing channel function and removing debris from culverts and around

flood control infrastructure such as trash racks and pump stations. Therefore the project will result in less-than-significant impacts.

		Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b)	**Substantial erosion of soils due to wind or water forces and attendant siltation from excavation, grading, or fill? (source #(s): 3)**	[ ]	[X]	[ ]	[ ]

This is a flood control maintenance project with primary objectives to remove vegetation, debris and accumulated sediment to maintain channel function and facilitate unobstructed flow around public infrastructure including bridges, storm drains, trash racks, and pump stations. Another aspect of the project is to prevent bank erosion and sedimentation into adjacent creek channels. The only sediment that will be excavated is below water line in creeks, channels sediment basins and drainage ditches; there will be no excavating or grading of adjacent channel banks, and no permanent fill is involved in the project unless it is related to a bio-engineered streambank stabilization project. Each activity includes prescribed Best Management Practices (BMPs), which are mandated to be employed during and after project implementation. Erosion control BMPs are implemented to keep soil from leaving the work sites. During work activities there may be a temporary increase in turbidity in drainages as sediment is disturbed from the dredging process and potential water quality impacts could have a negative effect upon aquatic life. Avoidance and minimization measures to protect threatened and endangered species and sensitive habitats are discussed in Section V. 7 (a). Implementation of the following mitigation measures are incorporated into the project description and will decrease the impacts of erosion and sedimentation to a less than significant level.

MITIGATION MEASURES

V.3 (b)-1. The District shall designate an Environmental Compliance Coordinator (ECC) to oversee the implementation of the RMA in the field. Before commencement of a maintenance activity, the ECC shall review Site Fact Sheets for specific information on the type, location and extent of the activity and associated areas of disturbance and determine the Avoidance and Minimization Measures and Best Management Practices (BMPs) to implement prior to the maintenance activity. The ECC shall distribute the Site Fact Sheet to the Maintenance Supervisor five days before beginning the maintenance activity.

V.3 (b)-2. Erosion control BMPs shall be incorporated into each project to minimize the discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. Erosion control measures shall be monitored during and after storm events and modifications shall be made, if needed.

V.3 (b)-3. If a maintenance activity may cause the introduction of sediments into the stream, no phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start up of any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the ECC shall inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

V.3 (b)-4. DPW shall construct the project in a manner that reduces turbidity and protects water quality, resident fish and other aquatic species. To prevent streambed erosion from the use of temporary cofferdams, pipes and pumps used to de-water the creek channel, diversion pipe outlets would be placed on hard surfaces or outfall

protection in the form of rock or similar material would be installed. These temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after project completion and the creeks shall be restored to their natural condition.

V.3 (b)-5. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material that may be washed into waters of the State shall be removed from the work area and transported to a legal upland spoils disposal site.

MITIGATION MONITORING MEASURES

V.3(b)-1-5. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Substantial changes in topography from excavation, grading or fill, including but not necessarily limited to: 1) ground surface relief features; 2) geologic substructures or unstable soil conditions; and 3) unique geologic or physical features? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

A long-term objective of this maintenance project is to restore natural channel formation and to decrease the potential risk and frequency of flooding. A localized change in stream channel and sediment basin topography will occur through the removal of sediment within the creek channels and drainages. It shall be the minimum amount needed to restore natural channel function and facilitate unobstructed flow conditions. Given the nature of the project, the changes in channel topography are desired outcomes. Given that the sediment to be removed is caused by deposition of eroded sediment from the upper watershed into the lower flood control drainages, impacts to these channels from excavation should be positive in nature. Consequently, the project will result in less-than-significant impacts.

4. WATER. ***Would the proposal result in*:**

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantial changes in absorption rates, drainage patterns, or the rate and amount of surface runoff? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

Drainage patterns and rate of surface run-off into drainages within the project area from the upper watersheds and adjacent neighborhoods will remain unaltered. The removal of sediment and obstructing vegetation from these channels will increase the channel's ability to carry surface run-off during high flood flows and improve connectivity between downstream and upstream habitats. If the channels have greater functional ability after

maintenance has been performed, the potential risk of flooding of adjacent roads and property will be reduced. Consequently, the project will result in less-than-significant impacts.

b) Exposure of people or property to water related hazards, including, but not necessarily limited to: 1) flooding; 2) debris deposition; or 3) similar hazards ? (source #(s): 3)	**Significant Impact** [ ]	**Potentially Significant Unless Mitigated** [ ]	**Less Than Significant Impact** [X]	**Not Applicable** [ ]

This is a flood control project which will decrease potential for flood hazards caused by vegetation or debris deposition around culverts, trash racks, pump stations, and tide gates during high flows. By removing vegetation and sediment from the channels, ditches and sediment basins identified within the project area, the channels will be altered to improve natural channel function and decrease the threat of potential flooding of adjacent roads and property. The project will have an overall beneficial effect on preventing potential flood hazards and debris deposition; consequently the project will result in less-than-significant impacts.

c) Discharge of pollutants into surface or ground waters or other alteration of surface or ground water quality (e.g. temperature, dissolved oxygen or turbidity)? (source #(s): 3)	**Significant Impact** [ ]	**Potentially Significant Unless Mitigated** [X]	**Less Than Significant Impact** [ ]	**Not Applicable** [ ]

This is a routine flood control maintenance project with the primary objective to remove vegetation and accumulated sediment to maintain channel function and unobstructed flow around structures including bridges, storm drain outlets, and pump stations, and to maintain stable stream banks where necessary. The only sediment that will be excavated is below water line in creeks, channels and drainage ditches; there will be no excavating or grading of adjacent channel banks, and no permanent fill is involved in the project. Each activity includes prescribed Best Management Practices (BMPs), which are mandated to be employed during and after project implementation. The BMPs are designed to keep soil from leaving the work sites (erosion control BMPs) and to repair collapsing stream banks which often contribute to siltation of streams (bio-engineered stream bank repair BMPs). During implementation there may be a temporary increase in turbidity as sediment is disturbed by the dredging process. Potential water quality impacts could have a negative effect upon water quality and aquatic life. Potential impacts to threatened and endangered species that are present within or near the project site area are discussed in Section V.7(a). Implementation of the following mitigation measures will decrease the risk of impacts of erosion or siltation to water quality and aquatic resources and will reduce these impacts to less than significant.

MITIGATION MEASURES

V.4(c)-1. The District shall implement maintenance activities in a manner that reduces turbidity and protects water quality, resident fish and other aquatic species. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area and transported to a legal upland spoils disposal site.

V.4(c)-2. Appropriate BMPs shall be incorporated into each project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. BMPs to be implemented for each type of activity are referenced in the

program documents and prescribed in the Project Fact Sheets for each site. Erosion control measures shall be monitored during and after storm events and modifications made, if needed. BMPS to be implemented are taken from the the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and the FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance.

V.4(c)-3. To prevent streambed erosion from the use of cofferdams, pipes and pumps used to de-water the creek, diversion pipe outlets shall be placed on hard surfaces or temporary outfall dissipation structures shall be installed (i.e. rock piles). Temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after project completion and the creeks shall be restored to their natural condition.

V.4(c)-4. No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start up of any phase of the project that may result in sediment run-off to the stream. If rainfall is predicted, erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the Environmental Compliance Coordinator shall inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

MITIGATION MONITORING MEASURES

V.4(c)-1-6. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

d)	**Substantial change in the amount of surface water in any water body or ground water either through direct additions or withdrawals, or through intersection of an aquifer by cuts or excavations? (source #(s):** 3)	**Significant Impact** [ ]	**Potentially Significant Unless Mitigated** [X]	**Less Than Significant Impact** [ ]	**Not Applicable** [ ]

A select set of sites within the project will need to be temporarily dewatered for equipment access for sediment removal and bank stabilization aspects of the project and to protect special status species such as steelhead trout. Creek flows will be diverted by the construction of temporary cofferdams around the active construction site and water will be transported from upstream to downstream reaches via pumps and pipes/hoses. The cofferdams will be constructed with native materials, including sand bags, gravel bags or equivalent materials and be sealed and secured with plastic sheeting and anchored in place. There will be temporary impacts on water resources within these creek channels during the dewatering process. This impact will be short-term and localized but has the potential to adversely affect aquatic resources in the project area. Threatened and endangered species that are present or near the project site are discussed in Section V.7.(a) and applicable mitigations are proposed to protect these species during dewatering. Implementation of the following best management practices will decrease the risk of impacts to water resources resulting from the dewatering process and reduce these impacts to less than significant.

MITIGATION MEASURES

V.4(d)-1. The District shall construct the projects in a manner that protects fish and other aquatic resources and avoids loss of their habitat. A biologist shall oversee project work and implement any necessary conservation

measures to protect these species, including pre-construction surveys and rescue and relocation to suitable upstream or downstream habitat.

V.4(d)-2. Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic. Intakes and outlets should be designed to minimize turbidity and the potential to wash contaminants into the stream. If a work site is to be temporarily dewatered by pumping, intakes should be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997). A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length. Once the project work is complete, water should be slowly released back into the work area to prevent erosion and decrease turbidity. The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration. All cofferdams, pumps, pipes, sheet plastic, silt fences or other non-native materials shall be removed from the stream upon project completion.

V.4(d)-3. Sufficient water shall at all times be allowed to pass downstream to maintain aquatic life below the diversion dam.

V.4(d)-4. For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials shall be removed from the stream following completion of the activity.

MITIGATION MONITORING MEASURES

V.4(d)-1-4. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

e) Substantial changes in the flow of surface or ground waters, including, but not necessarily limited to: 1) currents; 2) rate of flow; or 3) the course or direction of water movements? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The natural direction and rate of flow of groundwater will remain unchanged. The natural direction of flow of the creeks and channels will not change, but the rates of surface flow in some areas may increase with the decreased coefficient of friction resulting from the removal of sediment. As the channel function is increased, there may be a decrease in flood flows coming from the creeks and channels onto adjacent roads and properties, which is the objective of the project. Therefore, this is a less-than-significant impact.

f) Substantial reduction in the amount of water otherwise available for public water supplies? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and will not reduce the amount of water supply available to the public; therefore, this is a less-than-significant impact.

5. **AIR QUALITY.** ***Would the proposal:***

a) Generate substantial air emissions that could violate official air quality standards or contribute substantially to an existing or projected air quality violation? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the maintenance project. Since the work will occur out in the open air and over a short duration in each project area (1-7 days, depending on project site), the impact on air quality will be less-than-significant.

b) Expose sensitive receptors to pollutants, such as noxious fumes or fugitive dust? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the maintenance project. Since the work will occur out in the open air and over a short duration in each project area (1-7 days, depending on project site), the impact to sensitive receptors will be less-than-significant. The impact from dust will be minimal during sediment removal since the work is being done in the wet environment with very little volatile dust, therefore the impact to sensitive receptors will be less-than-significant.

c) Alter air movement, moisture, or temperature, or cause any change in climate? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

Planting of streamside native vegetation occurs as part of the STRAW Program, serving to decrease stream temperatures, increase carbon sequestration and reduce the impacts of global climate change, therefore, this is a less-than-significant impact.

d) Create objectionable odors? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The only odors that will be produced will come from the exhaust fumes from the heavy equipment used for the project and potentially smell coming from anaerobic soil conditions in a super saturated environment. The work will occur out in the open air and over a short duration (1-7 days, depending on project site), therefore the impact from objectionable odors will be less-than-significant.

6. TRANSPORTATION/CIRCULATION. ***Would the proposal result in:***

a) Substantial increase in vehicle trips or traffic congestion such that existing levels of service on affected roadways will deteriorate below acceptable County standards? (source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The project will deploy vehicles and equipment on a daily basis to the various project sites, where it will remain until the project is completed each day. No substantial increase in vehicular traffic or congestion will occur because of the project. The level of service on affected roadways will not drop below acceptable County standards. These impacts will be minor and are commensurate with currently-occurring traffic impacts associated with routine road maintenance activities along these roads in Marin County. Therefore, this is a less-than-significant impact.

b) Traffic hazards related to: 1) safety from design features (e.g. sharp curves or dangerous intersections); 2) barriers to pedestrians or bicyclists; or 3) incompatible uses (e.g. farm equipment)? ((source #(s): 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[X]	[ ]	[ ]

Project implementation will not result in dangerous design features or incompatible uses. Temporary staging of equipment along the road right-of-way could result in the temporary re-direction of vehicle, bicycle and pedestrian traffic. The proposed maintenance project is along County of Marin or local municipality maintained roads and road crews and contractors are experienced at conducting procedures to avoid road traffic hazards. Implementation of the following mitigation measure will decrease the risk of impacts to traffic hazards and reduce these impacts to less than significant.

MITIGATION MEASURES

V.6 (b)-1. The County maintenance crews and any Contractors on the project shall clearly mark alternative routes with traffic control signs during project implementation to ensure public safety.

MITIGATION MONITORING MEASURES

V.6 (b)-1. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Inadequate emergency access or access to nearby uses? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

Alternative routes shall be clearly marked with County of Marin traffic control signs or communicated on site by County Roads maintenance crews. Emergency vehicles would be given special consideration to provide unimpeded and continual access to roadways during the maintenance period. Therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
d) Insufficient parking capacity on-site or off-site? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

Because equipment will sometimes be staged from the road right-of-way, there could be a temporary loss of pull-out areas used for parking at some sites along project related roads, where staging of County vehicles and equipment could result in the temporary use of part of these pull-out areas. Due to the temporary maintenance nature of the project, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
e) Substantial impacts upon existing transportation systems, including rail, waterborne or air traffic systems? (source #(s): 3)	[ ]	[ ]	[X]	[ ]

Due to the temporary maintenance nature of the project, no substantial impacts upon existing transportation systems will occur on or around the project sites. Minor road diversions may be required during project activities, with alternative routes clearly marked with County of Marin traffic control signs or communicated on site by County Roads maintenance crews. Therefore, this is a less-than-significant impact.

7. BIOLOGICAL RESOURCES. ***Would the proposal result in:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats including, but not necessarily limited to: 1) plants; 2) fish; 3) insects; 4) animals; and 5) birds listed as special-status species by State or Federal Resource Agencies? (source #(s): 3, 4)	[ ]	[X]	[ ]	[ ]

In order to assess and mitigate for potential impacts to special status species and their habitats, a biologic assessment was conducted which looked at potential impacts of all routine maintenance activities on special status species and their habitats; (Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works, California. July 2011). Those species with a moderate to high potential to occur, or those species prominent in the regulatory environment are discussed in detail in the Biological Assessment and actions to avoid impacts to these species and their habitats are summarized in this section.

Based on quad searches and special status species listings from federal and state agencies searches, 80 special status animal species have been identified as having some potential of occurring within the project sites. Of these, only 16 species, based on literature and database reviews and familiarity with local fauna, are considered likely to occur within the project sites and eight of these are listed as threatened or endangered including:

- Central California Coast coho salmon (*Oncorhynchus kisutch*)
- Central California Coast steelhead trout (*Oncorhynchus mykiss irideus*)
- California red-legged frog (*Rana draytonii*)
- Northwestern pond turtle *(Clemmys (Actinemys) marmorata marmorata*)
- California clapper rail (*Rallus longirostris obsoletus*)
- California black rail (*Laterallus jamaicensis coturniculus*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Salt marsh harvest mouse (*Reithrodontomys raviventris*)

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites. Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed as threatened or endangered; all are species of concern.

- Point Reyes bird's-beak (*Cordylanthus maritimus ssp. palustris*)
- Pale Yellow/Hayfield tarplant *(Hemizonia congesta ssp. congesta)*
- Marsh microseris *(Microseris paludosa)*
- Marin knotweed *(Polygonum marinense)*

The RMA program is complex; at any one time during the work season, different work activities may be occurring at several sites, with several different contractors. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality. Pre-construction surveys to locate special status species will be conducted before maintenance activities commence as prescribed and work at each site will be scheduled around relevant work windows where possible to avoid impacts (Table 1; page 7). Work at a site may be re-scheduled based on survey finding if necessary. A suite of General and Activity-Specific Conditions apply to activities implemented as part of the RMA program as well as species-specific Avoidance and Minimization Measures (AMMs).

Best Management Practices (BMPs) have been prescribed for each project site, depending on activity type, site constraints, and species presumed to be present. BMPs to be implemented at each site are referenced from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and FEMA.

General and Activity-Specific Conditions, AMMs and BMPs are incorporated into the RMA project description and included in the individual Project Fact Sheets for each site. The job of the Environmental Compliance Coordinator is to ensure that all measures are employed as prescribed in the field prior to, during and after implementation. The General and Activity-Specific Conditions, AMMs and species-specific AMMs are described in detail below and included in the Project Fact Sheets developed for each site.

MITIGATIONS

The following mitigation measures are proposed to avoid and minimize the reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats and would decrease the risk of impacts to a level of less than significant.

GENERAL CONDITIONS

V.7(a)-1. Designation of Environmental Compliance Coordinator- An Environmental Compliance Coordinator (ECC) shall be designated by the County of Marin Flood Control District. The ECC shall have an understanding of biological resources, missions of regulatory agencies, regulations as they may affect listed species, and the nature of the maintenance activities. In the planning stage, before commencement of a maintenance activity, the ECC shall review project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he shall determine appropriate pre-construction surveys that may be required, depending on the species involved and the type of activity planned for that project site. The ECC shall ensure that the project crews adhere to General and Activity-Specific Conditions and Avoidance and Minimization Measures prescribed for each site and type of activity.

V.7(a)-2. Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

V.7(a)-3. Contractor Crew Training- The ECC shall ensure that before work starts, all on-site maintenance activity personnel and contractors receive instruction regarding the presence and description of listed species at each project site and the details of appropriate avoidance and minimization measures.

V.7(a)-4. Site Preparation/Wildlife Reconnaissance - The ECC shall walk the site each day before maintenance activities commence to locate wildlife; if any special status wildlife species are noted, work shall not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

V.7(a)-5. Monitoring and Reporting Program- The ECC shall implement a monitoring and reporting program that shall include, but not be limited to: preparing each year's project list, scheduling pre-construction surveys, overseeing project activity during maintenance, preparing photo documentation, and evaluating post-maintenance restoration/revegetation, if necessary. Reporting regarding project impacts to California red-legged frogs shall be performed in accordance with the terms and conditions issued by the USFWS. Report of sightings will be documented using the CNDDB protocols published by the Department of Fish and Game. .

V.7(a)-6. Work Windows - To avoid impacts to special status species, the maintenance activities carried out shall typically occur during the summer low flow season. The general work window for RMA activities is from April

15th to October 15th, depending on weather. As a rule, work at each site will be scheduled around relevant work windows to avoid impacts. In instances where work needs to be scheduled outside of an established work window for a particular species in a specific location, species-specific pre-construction surveys will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of Avoidance and Minimization Measures before proceeding. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality. The work window for streamside restoration by the STRAW Program is from October-March when schools are in session.

SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES (AMMs)

Avoidance and Minimization Measures for Fish

FISH-1: Salmonids

Several project sites within the RMA watersheds have the potential for presence of steelhead trout. If steelhead are known to be absent from the project site based on CEMAR/DFG surveys or there are long-standing natural or artificial downstream barriers sufficient to prevent upstream migration, then avoidance has been accomplished and no further actions are necessary. Presence or absence of steelhead trout in each project area is documented in the project fact sheets which are used on a daily basis by the Environmental Compliance Coordinator to guide the implementation of AMMs and BMPs in the field before, during and after completion of maintenance activities.

If steelhead trout are determined or presumed to be present at the project site, then the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-7. Work Window: All work in and around salmonid streams is restricted to the period of June 15th to October 15th in any given year. This is to take advantage of low stream flow and avoid the spawning and egg/alevin incubation period which occurs in the late fall and the outmigration period in the spring. Work outside of the channel is not subject to this modified work period.

V.7(a)-8. No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified biologist.

V.7(a)-9. To minimize turbidity and stress to salmonid species, personnel shall avoid walking through stream pools and thalwegs, and shall instead walk across riffles or outside of the stream bed to access a project site.

V.7(a)-10. To minimize disturbance during sediment removal activities, if there is flow or seepage in a work site, a reach of creek may have to be de-watered. Before construction of the de-watering system, a qualified biologist shall conduct fish relocation activities, and immediately release captured fish to a suitable habitat near the project site.

V.7(a)-11. Screens shall be placed on all pumps used for dewatering the work site in accordance with NOAA Fisheries' Fish Screening Criteria for Anadromous Salmonids (NMFS, 1997).

V.7(a)-12. If used, coffer dams shall be constructed upstream of the work site within the stream banks, and shall be constructed with clean river gravel or sand bags and covered with sheet plastic. Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into streams.

V.7(a)-13. Pump discharge must be directed into a settling basin to allow silt removal. Once the project work is complete, water shall be slowly released back into the creek to prevent erosion and limit turbidity.

V.7(a)-14. All habitat improvements on salmon and steelhead streams shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (CDFG 2010d).

Avoidance and Minimization Measures for Reptiles

REP-1: Northwestern pond turtle

Several sites may contain suitable habitat for northwestern pond turtle, and they have been known to occur at sites 1-ASJ-1, 1-LYC, and 1-WAR-2.

V.7(a)-15. Work window: There is no work windows for this species; surveys may be required if maintenance activities will occur in potential pond turtle habitat. Prior to and during maintenance work, the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-16. Pre-construction surveys for northwestern pond turtles shall be conducted at these sites by a qualified biologist in accordance with USFWS protocols within 72 hours of the start of maintenance. The creek shall be surveyed for presence of turtles and the creek banks surveyed for presence of burrows; all locations of observed turtles and burrows shall be noted.

V.7(a)-17. Each day, before maintenance activities begin, the Environmental Compliance Coordinator (EEC) shall make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, the ECC shall assess the likelihood of project impacts to these species and coordinate findings with the USFWS and CDFG to ensure that appropriate protective measures are applied including hand removal or installation of fencing to avoid the area completely. At any time during maintenance activities, if a northwestern pond turtle is observed by the ECC, maintenance crew, or other knowledgeable persons, maintenance activities shall stop and the appropriate protective measures shall be applied including hand removal or installation of fencing to avoid the area completely.

V.7(a)-18. All staging areas for all heavy equipment, storage of materials, and any maintenance/fueling of heavy equipment shall be clearly identified in order to minimize impacts to upland habitats outside the project site.

V.7(a)-19. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of northwestern pond turtles, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Avoidance and Minimization Measures for Birds

Following are avoidance and minimization measures for birds. Some of these relate directly to listed species with the potential to occur within one or more of the project sites (the rails, northern spotted owl); however, others relate more generally to a class of species, such as raptors and wading birds and land birds.

V.7(a)-20. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. Because the culverts in the proposed project sites are fairly small, there is minimal likelihood that they would provide suitable habitat for swallows. However, if any culverts show evidence of past or current swallow nesting, the ECC shall identify them and maintenance activities shall occur after August 31 or after all swallows have fledged to avoid impacts.

V.7(a)-21. If work in the riparian zone will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

BIRD-1: California Clapper Rail and California Black Rail

Several of the sites are within or immediately adjacent to suitable habitat for California clapper rail and California black rails (15-20 sites). The following avoidance and minimization measures apply to all sites within 250 feet of salt or brackish tidal marshland, which will also help to protect other marshland dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

V.7(a)-22. Work window: The work window for maintenance activities within rail habitat is the non-nesting season of September 1st through January 31st. If maintenance activities are scheduled to ocur within the nesting season (February 1st to August 31st), the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-23. Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails.

V.7(a)-24. If maintenance activities are scheduled during the nesting season (February 1st to August 31st, a qualified biologist, in coordination with USFWS and/or CDFG, shall conduct a pre-construction survey within 5 days of the start of maintenance activities to check for nests and presence of the rails within the project sites. Additional surveys may be required including visual and/or call surveys to determine presence. A buffer zone of 250 feet from nests or occupied rail habitat shall be established and any activity within that buffer zone that has potential to disturb rails (i.e. high-decibel construction, pumping, use of heavy machinery, etc.) shall be rescheduled for later in the season once nesting has ended and the young have fledged (from September 1st through January 31st). If no nests are found but rails are present, the birds must be allowed to leave the area on their own before work can commence.

V.7(a)-25. When working within 250 feet of salt or brackish marshland, presence for either rail species shall be assumed; therefore, maintenance work in these areas shall be scheduled between September 1st and January 31st in any given year.

V.7(a)-26. Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If maintenance or dredging activity does intrude into tidal marsh habitat, a qualified biologist shall survey the area prior to beginning work in order to determine the presence/absence of rails.

BIRD-2: Northern Spotted Owl

Per Department of Fish and Game Protocol for Surveying Proposed Management Activities that May Affect Northern Spotted Owls (2010), project sites are defined as the project footprint plus a .25 mi. radius buffer around it. Centers of northern spotted owl activity are located on Old Mill Creek, Cascade Creek, Warner Canyon Creek, Bothin Creek, Larkspur Creek, and Ross Creek and several of these documented locations fall within the .25 mi. buffer around several of the work sites: (3-OMC; 3-CAS; 3-WAR; 9-BOTH; 9-LAR-2; and 9-ROS).

V.7(a)-27. Work window: To avoid impacts to breeding northern spotted owls, maintenance activities identified as having potential impact on northern spotted owls or their habitat shall follow a limited operating period (LOP) with no work scheduled during the breeding season of February 1st through July 15th. If a biological evaluation conducted by a qualified biologist determines that vegetation projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location, or where a biological evaluation determines that topographic features may shield nest sites, the LOP may be waived or the buffer distance modified.

BIRD-3: Raptors and wading birds

Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them shall be minimized.

V.7(a)-28. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start outside of the nesting season (July 31 – January 31), then avoidance has been achieved and work can proceed. If maintenance activities are scheduled outside of the work window during the nesting season (Feb 1st- July 31st) then the following AMMs shall be followed:

V.7(a)-29. The ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

V.7(a)-30. During nesting season, (February 1st - September 1st), the ECC shall walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

V.7(a)-31. At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. However, if work in the riparian zone will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

BIRD-4: Landbirds

Many of the project sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. These project sites include: 1-NOV-3, 3-ACMP-3, 3-NYH-2, 5-EAS-2, 9-CMC-4, and many more. Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or

premature fledging. Destruction or disturbance of active nests would violate the federal Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game (CDFG) Code.

V.7(a)-32. Work window: Avoidance will be achieved if maintenance activities are scheduled between August 1st to January 31st to avoid the nesting season (February 1st - July 31st). If maintenance activities are scheduled outside of the work window, then the following Avoidance and Minimization Measures shall be implemented:

V.7(a)-33. The removal of any trees or shrubs shall occur after August 1st, once the nesting season is complete. If removal of trees or shrubs occurs between February 1st and July 31st, a nesting bird survey shall be performed by a qualified biologist within 14 days prior to the removal or disturbance of potential nesting trees or shrubs. All trees with active nests shall be flagged and a non-disturbance buffer zone shall be established around the nesting tree, or the site shall be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft for passerines and non-passerine land birds. Active nests shall be monitored by a qualified biologist to determine when the young have fledged and are feeding on their own before work is allowed to begin.

V.7(a)-34. In addition to surveying trees and shrubs for nesting birds, surveys shall be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within 14 days prior to the commencement of project related activities by a qualified biologist.

V.7(a)-35. The ECC shall be present at the commencement of maintenance-related activities to ensure that nesting birds and sensitive bird species have not inhabited the project site during the window following pre-construction surveys and commencement of maintenance activities. The ECC shall also survey all staging areas to ensure nesting and special status birds are not present.

V.7(a)-36. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of sensitive habitat and bird species, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Avoidance and Minimization Measures for Mammals

MAMM-1: Salt Marsh Harvest Mouse (SMHM)

Salt marsh harvest mouse is a federal and state listed endangered species although critical habitat has not been designated for this species. This species is found in saline emergent marsh vegetation with dense pickleweed. It is reported to occur within the project site in lower reaches of Novato Creek levees, Gallinas Creek South Fork, and Bothin Marsh sites. Approximately 15-20 sites are adjacent to suitable habitat for salt marsh harvest mouse; and about half of those sites include work where removal of pickleweed may impact salt marsh harvest mouse habitat. For these sites, the following AMMS should be followed:

V.7(a)-37. Work window: There are no seasonal work windows for this species since they breed year around,

V.7(a)-38 Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for SMHM. Generally, work should not be scheduled to occur between two hours before high tide and two hours after high tide.

V.7(a)-39. If maintenance activities are conducted in potential SMHM habitat, a qualified biologist shall conduct a pre-construction survey within 5 days of the start of maintenance activities to determine the presence/absence of SMHM within and adjacent to the work area. Surveys shall follow USFWS protocols. In addition, a biological

monitor shall be present during maintenance-related activities within or adjacent to all suitable nesting habitat areas to ensure that salt marsh harvest mice are not present during operations.

V.7(a)-40. For sites where work includes removal of pickleweed, under the supervision of a qualified biologist and according to protocols established by Zedler (2001), vegetation shall be removed only with non-mechanized hand tools; no motorized equipment shall be used. Vegetation removal may begin only when no mice are observed, and shall start at the edge farthest from the salt marsh and work its way towards the salt marsh. If a mouse of any species is observed within an area where pickleweed is being removed, work shall stop and DFG shall be notified. Unless otherwise approved by DFG, the mouse shall be allowed to leave on its own volition.

V.7(a)-41. If trenching takes place within 50 ft of pickleweed areas, exclusionary fencing shall be installed around worksites before excavation begins, according to DFG specifications on size and placement of fencing. An escape ramp shall be placed in any open trench at the end of the day to allow any entrapped animals to escape.

V.7(a)-42. When implementing maintenance activities in upland areas adjacent to salt or brackish marshland, vehicles shall be confined to existing roads where possible, Crews shall use matting, pontoon boards or other comparable methods whenever feasible to minimize impacts to the existing vegetation. The placement of mats shall be verified by a qualified biologist before their placement to minimize habitat impacts. Crews shall work exclusively from mat boards and boardwalks to minimize trampling of vegetation.

V.7(a)-43. A biological monitor shall be on-site during all work activities within potential SMHM habitat, and will have the authority to halt project activities in order to comply with these terms. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of the SMHM and its habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

MAMM-2: Roosting Bats

V.7(a)-44. Work window: The work window for activities at sites where bats are determined to be present is from September 1st through January 31st. Impacts can be avoided by scheduling work, especially removal of trees and/or dense growths of ivy, after the breeding season ends on September 1st of any given year.

V.7(a)-45. Some of the sites may be within or adjacent to suitable habitat for roosting bats. If work is conducted outside of the work window, pre-construction surveys for signs of roosting bats shall be conducted concurrent with those for land birds. If surveys occur during the daytime, the biologist shall look for presence of bat droppings at likely roost sites (under bridges and trees (in layers of bark, woodpecker holes, and hollow branches). The droppings are black and small, about 4 – 8 mm long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software. If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed.

V.7(a)-46. If bat guano was detected during the pre-construction survey, and removal of trees, shrubs, or dense ivy is scheduled to occur before September 1st, a qualified biologist shall conduct a roosting bat survey within 30 days prior to the removal or disturbance of potential nesting/roosting trees or shrubs. If bats are detected, work shall be re-scheduled for after the breeding season.

Avoidance and Minimization Measures for Plants

PLANT-1: Special Status Plants

Special-status plant species include those listed as Endangered, Threatened, Rare or those species proposed for listing by the USFWS (2001b), the CDFG (2010a,b) and the CNPS (2010). The CNPS listing is sanctioned by the CDFG and serves essentially as their list of "candidate" plant species. CNPS List 1B and List 2 species are considered eligible for state listing as endangered or threatened under the CDFG Code. Such species should be fully considered during preparation of environmental documents subject to the California Environmental Quality Act (CEQA). CNPS List 3 and List 4 species are considered to be either plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS and CDFG recommend that these species be evaluated for consideration during the preparation of CEQA documents.

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites (Appendix A). Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed; all are species of concern. Based on a reconnaissance-level survey and habitat assessment, many of the 33 species with at least some potential to occur within the region can be ruled out from the work sites due to the lack of suitable habitat within the project corridor. Specialized habitats such as playas, coastal dunes, lower montane coniferous forest, vernal pools, coastal bluff scrub, coastal prairie, and serpentine-derived soils or outcrops are not present within the study area or work sites.

Although location data for several special-status plant species places them within the study corridor, the presence of some of these within the work sites remains highly unlikely. In many cases, the location data from CNDDB represent historic data from the time period before large-scale development. In other cases, the CNDDB data represent best guesses as to location, and while shown as covering the proposed project sites, the required habitat may not be present within the work sites.

The following four plant species are considered to have some potential to occur within one or more of the work sites, due to: 1) the presence of suitable habitat, 2) the plant was detected during the site reconnaissance, and/or 3) the species has been reported within the vicinity of the work sites.

1. ***Point Reyes bird's-beak (Cordylanthus maritimus ssp. Palustris;*** *STATUS. Point Reyes bird's beak is a federal species of special concern and is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE The CNDDB lists 42 occurrences of Point Reyes bird's beak in Marin County; the majority of these are on the western coast. Sites near CNDDB occurrences include: 3-BM, 3-MIL-3, 3-RYC-1, 3-SUT-1.*

2. ***Pale Yellow/Hayfield tarplant*** *(*Hemizonia congesta ssp. congesta*) STATUS. The pale yellow tarplant is not listed by the federal or state governments but is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE. The CNDDB lists a record in Ignacio near sites 1-ASJ-1, 1-ASJ-2, and 1-ASJ-3.*

3. ***Marsh microseris (Microseris paludosa)*** *STATUS. The marsh microseris is not listed by the federal or state governments but is listed by the CNPS as 1B.PROJECT SITE OCCURRENCE. The CNDDB lists occurrences in the vicinity of sites: 3-CAS, 3-ACMP-3, and 9-LAR-2.*

4. Marin knotweed (*Polygonum marinense*) *STATUS. Marin knotweed is a federal species of special concern and is listed by the CNPS as 3 (needing taxonomic review). PROJECT SITE OCCURRENCE. The CNDDB contains record for Marin knotweed on Corte Madera Creek, just downstream of site 9-CMC-1 and at the creek mouth.*

The following mitigations developed for treatment of special status plants and their habitats shall be adhered to during project implementation; therefore impacts to these species will be less-than-significant:

V.7(a)-47. Work window: There are no work windows for the plant special status species; surveys may be required if species may be impacted.

V.7(a)-48. At sites where vegetation may be modified (such as mowing, clearing, or ground-breaking), and where special status plant species may potentially occur, a qualified biologist should conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

V.7(a)-49. If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000). Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

V.7(a)-50. If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

V.7(a)-51. For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDB documenting the species and location. The ECC shall ensure that the Project Foreman is aware of these site-specific conditions, and shall inspect the work site before, during, and after completion of the maintenance activities.

MITIGATION MONITORING MEASURES

V.7 (a)-1-51. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

b)	**Substantial change in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur at any time throughout the year?** **(source #(s):** 3, 4)	**Significant Impact** [ ]	**Potentially Significant Unless Mitigated** [X]	**Less Than Significant Impact** [ ]	**Not Applicable** [ ]

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.
As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

All construction activities for the project would be completed in a fashion that minimizes disturbance to existing riparian and aquatic habitat. The proposed removal of riparian vegetation is the absolute minimum necessary to provide access for maintenance equipment, restore the natural flow regime, provide flood protection, and minimize loss of riparian trees. Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program.

Avoidance and minimization measures prescribed for each activity at each site have been established and shall be implemented to ensure that animals inhabiting the project area. The following mitigation measures are proposed to avoid and minimize changes in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur on the project site and would decrease the risk of impacts to a level of less than significant.

MITIGATION MEASURES

V.7(b)-1. DPW shall minimize any riparian tree removal in order to preserve habitat quality. Removal of native riparian vegetation shall be limited to that necessary for equipment access and flood control (e.g., removing fallen trees in channels).

V.7 (b)-2. An Environmental Compliance Coordinator (ECC) shall be designated for all maintenance activities. The ECC shall have an understanding of biological resources, missions of regulatory agencies and regulations as they may affect listed species, and the nature of the maintenance activities. Before commencement of a maintenance activity, the ECC shall review the individual project fact sheets containing project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he shall determine appropriate measures to implement, based on the type of activity, and shall prescribe appropriate avoidance and minimization measures and general and activity-specific conditions and prohibitions.

V. 7 (b)-3. All prescribed General Conditions and Avoidance and Minimization Measures, as described above and documented in the Project Fact Sheets for each project site, shall be adhered to during pre-project planning, implementation and post-project clean-up.

V. 7 (b)-4. The ECC shall ensure that the Project Foreman is aware of any site-specific conditions and avoidance and minimization measure prescribed for the activity at each site, and shall inspect the work site before, during, and after completion of the maintenance activities.

MITIGATION MONITORING MEASURES

V.7(b)-1. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

c)	**Introduction of new species of plants or animals into an area, or improvements or alterations that would result in a barrier to the migration, dispersal or movement of animals?** (source #(s): 3, 4)	**Significant Impact** [ ]	**Potentially Significant Unless Mitigated** [X]	**Less Than Significant Impact** [ ]	**Not Applicable** [ ]

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary. Exotic plants are often introduced by seed banks contained in imported fill or mud that is caked onto construction equipment that moves from site to site. The District shall not bring any fill to project sites. Invasive plants can also be introduced by seeds contained in hydro-seed mixes or hay products. Therefore, sediment and erosion control measures shall avoid using these products and use only weed-free rice straw or other similar products for erosion control.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program.

The ability of wildlife to move through the landscape is important for migration (seasonal breeding and feeding), dispersal (new home ranges and long-term genetic exchange), and for daily movement within individual territories. Habitat fragmentation creates a greater number of habitat patches that are smaller in size than the original contiguous habitat. This, in turn, can hinder regional wildlife movements, put stress on local populations, and increase the probability of extinction for these populations compared to those associated with non-fragmented landscapes. Considering the impacts resulting in potential fragmentation of primary habitat types and loss of valuable dispersal corridors is important when assessing the biological impacts of a project. Because the activities proposed do not involve the permanent loss of wetland and/or riparian habitat within the work sites, they are not likely to affect wildlife movement corridors or contribute to habitat fragmentation. Given that the proposed work is maintenance-related, the project will likely only result in short-term temporal impacts (1-2 days) to movement for aquatic species dependent the subject habitats. Movement through these areas will be restored as soon as maintenance activities are completed.

Removal of excessive sediment should help to open the channel and enhance opportunities for resident and migratory fish and other aquatic species to move freely to suitable upstream and downstream habitats. Re-colonization of on-site native wetland vegetation communities to their previous condition will occur naturally. Implementation of the following mitigation measures would decrease the risk of impacts caused by the accidental introduction of new species of plants or animals into the project area to a level of less than significant.

MITIGATION MEASURES

V.7(c)-1. The District shall prevent the unintentional introduction of new species of plants or animals into the project area by a wash down of all equipment prior to transporting it to project sites in order to eliminate mud that may harbor exotic plant species and animals.

V.7(c)-2. The District shall not import fill to project sites.

V.7(c)-3. The District shall only use straw wattles that contain weed-free rice straw and shall not use hydro-seeding or seeded hay products.

V.7(c)-4. If kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

MITIGATION MONITORING MEASURES

V.7(c)-1-4. District staff shall verify that these Mitigation Measures have been properly implemented.

8. ENERGY AND NATURAL RESOURCES. ***Would the proposal result in:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantial increase in demand for existing energy sources, or conflict with adopted policies or standards for energy use? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

Due to the maintenance nature of the project, no increase in demand for existing energy sources or standards for energy use will be affected. Therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Use of non-renewable resources in a wasteful and inefficient manner? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

The project is maintenance in nature and implementation will require very little use of non-renewable natural resources, however some fuel will be spent on equipment usage, although the impact of this usage would create a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
c) Loss of significant mineral resource sites designated in the Countywide Plan from premature development or other land uses which are incompatible with mineral extraction? (source #(s): 1)	[ ]	[ ]	[X]	[ ]

No significant mineral resources are found on the project site, therefore, this is a less-than-significant impact.

9. HAZARDS. ***Would the proposal involve:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) A risk of accidental explosion or release of hazardous substances including, but not necessarily limited to: 1) oil, pesticides; 2) chemicals; or 3) radiation)? (source #(s): 1, 3)	[ ]	[ ]	[X]	[ ]

Best Management Practices, including those covering Chemical Use shall be employed to prevent or reduce the risk from, or impacts from, the accidental discharge of chemicals from vehicles operating at the project sites. Therefore, this is a less-than-significant impact.

b) **Possible interference with an emergency response plan or emergency evacuation plan? (source #(s): 3, 4).**	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The sediment removal activities shall not interfere with an emergency response or evacuation plan. In the case of an emergency, all heavy equipment shall immediately be removed from the roadway in order to allow vehicles to enter the area. Heavy equipment deployed at the project site can be removed in a matter of a few minutes during an emergency or evacuation. Therefore, this is a less-than-significant impact.

c) **The creation of any health hazard or potential health hazard? (source #(s): 3)**	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The implementation of routine maintenance activities will not create any potential health hazards; therefore, this is a less-than-significant impact.

d) **Exposure of people to existing sources of potential health hazards? (source #(s): 3)**	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The removal of sediment from the creeks and channels and replanting streamsides with native vegetation will not expose people to existing sources of health hazards; therefore, this is a less-than-significant impact.

e) **Increased fire hazard in areas with flammable brush, grass, or trees? (source #(s): 3)**	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

One of the primary goals of vegetation management is to reduce fire fuels lading and the potential for fire hazards. Fire fuel reduction is achieved by mowing on tops of banks and levees, removal of fallen trees, removal of standing dead trees, and thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas. Therefore the proposed project will have a positive effect on reducing fire hazards, therefore this is a less-than-significant impact.

10. NOISE. ***Would the proposal result in*:**

a) **Substantial increases in existing ambient noise levels? (source #(s): 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

There will be a temporary increase in ambient noise levels during normal working hours if heavy equipment (e.g. backhoe or excavator) is used to remove sediment from the creeks, channels and drainage ditches. The duration of the impacts will be short, typically a few days, depending on the site, and the noise level will be comparable to noise generated during typical routine maintenance activities conducted by public works or flood control districts. The noise impact be limited to typical day time construction hours between 7 a.m. and 5 p.m., therefore, this is a less-than-significant impact.

b) **Exposure of people to significant noise levels, or conflicts with adopted noise policies or standards? (source #(s): 1, 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

There will be an increase of noise levels during implementation of maintenance activities but only for a temporary time as with any maintenance project. Any increase in noise levels from construction equipment on private property will occur where landowners have given prior permission for maintenance activities to occur. The increase in maintenance related noise levels would only occur during weekdays, from approximately 8:00 a.m. to 4:00 p.m. This is consistent with the County's adopted noise policy from 7am-6pm, Mon.-Fri. and not on holidays. Therefore, this is a less-than-significant impact.

11. **PUBLIC SERVICES.** ***Would the proposal have an effect upon, or result in a need for new or altered government service in any of the following areas:***

a) **Fire protection? (source #(s): 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The fire fuels reduction aspect of the project is designed to reduce the risk of fire along grassy levees and upper stream banks. Mowing is scheduled to be completed before the Fourth of July holiday as an added measure to prevent fires related to holiday fireworks. The project does not include a demand for additional fire protection services; therefore, this is a less-than-significant impact.

b) **Police protection? (source #(s) 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The sediment removal maintenance project will not have an effect on police protection; therefore, this is a less-than-significant impact.

c) **Schools?** (source #(s): 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

Project implementation will not result in dangerous design features or incompatible uses with schools; therefore this be a less than significant impact.

d) **Maintenance of public facilities, including roads?** (source #(s): 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

A primary goal of the proposed RMA program is to perform maintenance operations on County flood control channels and related infrastructure, including levees, tide gates, pump stations and trash racks. The objective of maintaining this infrastructure is to reduce the risk of potential flooding and consequential adverse impacts on other infrastructure including adjacent buildings and roads. The project itself will provide additional government services to protect people and infrastructure from flooding and will benefit the maintenance of public facilities; therefore this is a less-than-significant impact.

e) **Other governmental services?** (source #(s): 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

The RMA program does not create an increased demand for additional services but rather the project will increase governmental services by providing greater flood control protection through routine maintenance of flood control channels and related infrastructure, including levees, tide gates, pump stations and trash racks. Regular routine maintenance of facilities will reduce the risk of potential flooding and consequential adverse impacts on other infrastructure including adjacent buildings and roads. This in turn will decrease the need for emergency government services during high storm flows; therefore, this is a less-than-significant impact.

12. **UTILITIES AND SERVICE SYSTEMS.** ***Would the proposal result in a need for new systems, or substantial alterations to the following utilities:***

a) **Power or natural gas?** (source # (s): 1, 3)	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
	[ ]	[ ]	[X]	[ ]

No alterations to power or natural gas will be required for the maintenance project; therefore, this is a less-than-significant impact.

b) **Communications systems?** (source # (s): 1, 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

No alterations to communications systems will be required by the maintenance project; therefore, this is a less-than-significant impact.

c) **Local or regional water treatment or distribution facilities?** (source # (s): 1, 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

No alterations to water treatment or distribution will be required by the maintenance project; therefore, this is a less-than-significant impact.

d) **Sewer or septic tanks?** (source # (s): 1, 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

No alterations to sewer or septic tanks will be required by the maintenance project, therefore, this is a less-than-significant impact.

e) **Storm water drainage?** (source # (s): 1, 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

The flood control routine maintenance activities proposed in this project will have a positive affect on the function of flood control channels and streams to carry and conduct stormwater run-off. Limited removal of obstructing vegetation and excavation of sediment deposits will increase channel function and decrease the potential risk of flooding. The regular maintenance of tide gates and trash racks will increase the ability of storm flows to travel through stream channels. The project's objective is to maintain channel function, especially during peak storm events; therefore, this is a less-than-significant impact.

f) **Solid waste disposal?** (source # (s): 1, 3)	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[ ]	[X]	[ ]

No alterations to solid waste disposal will be required by the maintenance project; therefore, this is a less-than-significant impact.

13. **AESTHETICS/VISUAL RESOURCES.** ***Would the proposal:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
a) Substantially reduce, obstruct, or degrade a scenic vista open to the public or scenic highway, or conflict with adopted aesthetic or visual policies or standards? (source # (s): 1, 3)	[ ]	[ ]	[X]	[ ]

No alterations to scenic vistas will result from the maintenance project. The project would minimize potential impacts to sensitive habitats at the project sites and would be designed to blend into the surrounding natural environment to the greatest extent feasible. Some trimming of riparian trees will occur, but the project would not change the riparian character of the project sites. The projects would not obstruct or alter the visual character of the project sites or result in visual impacts to public or scenic views and vistas from adjacent roadways. Because this is a flood control maintenance project that does not result in any permanent structures and is temporary in nature, project activities would not adversely affect views, light or privacy of private properties. Therefore, this is a less-than-significant impact.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Have a demonstrable negative aesthetic effect by causing a substantial alteration of the existing visual resources including, but not necessarily limited to: 1) an abrupt transition in land use; 2) disharmony with adjacent uses because of height, bulk or massing of structures; or 3) cast of a substantial amount of light, glare, or shadow? **(source #(s):** 1, 3)	[ ]	[ ]	[X]	[ ]

No alterations to visual resources will result from the project. The project would minimize potential impacts to sensitive habitats at the project site and would be designed to blend into the surrounding natural environment to the greatest extent feasible. Some removal and trimming of riparian trees will occur, but the project would not change the riparian character of the sites. The projects would not obstruct or alter the visual character of the sites or result in visual impacts to public or scenic views and vistas from adjacent roadways. Because this is a flood control maintenance program that does not result in any permanent structures, project activities would not adversely affect views, light or privacy of private properties. Therefore, this is a less-than-significant impact.

14. **CULTURAL RESOURCES.** ***Would the proposal*:**

a) **Disturb paleontological, archaeological, or historical sites, objects, or structures? (source #(s): 1, 3)**	**Significant Impact**	**Potentially Significant Unless Mitigated**	**Less Than Significant Impact**	**Not Applicable**
	[ ]	[X]	[ ]	[ ]

The proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and many sites where sediment is to be removed have previously been dredged multiple times in the same locations. No historic structures will be impacted by the proposed routine maintenance project since no work is planned to be completed on any structures other than maintenance facilities including weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. Although no human remains or archaeological resources are known to occur within the proposed project sites or in the immediate vicinity, it is possible that there may be undiscovered archaeological resources buried at the sites due to their location in a high sensitive area. Such resources could be discovered during proposed sediment removal on the site, making this a potentially significant impact.

The following mitigation measures would reduce potential impacts to less than significant by detailing a course of action in the unlikely event that archaeological resources or human remains are encountered during construction activities.

MITIGATION MEASURES

V.14(a)-1. In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparations or construction activities on any part of the project sites, all work at the vicinity of the discovery site shall be halted immediately. A registered archaeologist, chosen by the County in consultation with the Federated Indians of Graton Rancheria and paid for by the District, shall assess the site and submit a written evaluation recommending appropriate actions to take to protect the site and the resources discovered, including monitoring of all subsequent work at the site by a Native American monitor from the Federated Indians of Graton Rancheria or other designated tribal representative. If human remains are encountered, the County Coroner must also be contacted and State law designates procedures to follow in the event that human remains are encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendent" can be designated. No work at the site may recommence without approval of the District. If it is determined that a prehistoric site exists, the following shall be implemented:

(a) No future development activity shall take place at or in close proximity to the prehistoric site within the development area;

(b) The historical site(s) shall be filled to protect the resources there;

(c) No additional excavation shall occur at these locations other than to remove surface organic material; and

(d) The District may be required to submit a revised project to protect the resource(s). No further work at the site may recommence without approval of the Department of Public Works Director. All

future development of the site must be consistent with findings and recommendations of an archaeological assessment prepared for the site by a registered archaeologist, as approved by the CDA staff.

MITIGATION MONITORING MEASURES

V.14(a)-1. In the event of discovery, DPW staff shall verify that a report has been submitted and all construction work has been stopped. In the event that the report indicates that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, DPW staff shall verify that a registered archaeologist has been retained to assess the site and has submitted a written evaluation to DPW advancing appropriate conditions to protect the site and the resources discovered before work commences on the site. If human remains are encountered, DPW staff shall verify that the County Coroner has been contacted and that all future work is carried out in accordance with the mitigation measures.

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
b) Have the potential to cause a physical change which would adversely affect unique ethnic cultural values, or religious or sacred uses within the project area? (source #(s): 1, 3)	[ ]	[ ]	[X]	[ ]

No known ethnic, religious or sacred uses are known to exist on or near the project sites. As noted above, the only structures included in the project description are maintenance facilities including weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. No other structures are involved. Accordingly, the proposed maintenance project would not have a significant impact on unique ethnic, cultural or religious uses or structures.

15. SOCIAL AND ECONOMIC EFFECTS. ***Would the proposal result in:***

	Significant Impact	Potentially Significant Unless Mitigated	Less Than Significant Impact	Not Applicable
Any physical changes which can be traced through a chain of cause and effect to social or economic impacts. (source #(s): 1, 3)	[ ]	[ ]	[X]	[ ]

The maintenance project will not result in any known physical changes to social or economic entities. Therefore, this is a less-than-significant impact.

VI. MANDATORY FINDINGS OF SIGNIFICANCE. Pursuant to Section 15065 of the State EIR Guidelines, a project shall be found to have a significant effect on the environment if any of the following are true:
(Please explain your answer after each question

		Yes	No	Maybe
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? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]
b)	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]
c)	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). *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project and the entire maintenance program would be mitigated to a level of insignificance. Therefore, this project has no cumulatively considerable effects. See Attachment B for assessment of cumulative impacts and mitigation measures associated with the overall maintenance program at 47 culvert/drainage sites in West Marin.*	[ ]	[X]	[ ]
d)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? *As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.*	[ ]	[X]	[ ]

VII. PROJECT SPONSER'S INCORPORATION OF MITIGATION MEASURES:

Acting on behalf of the project sponsor or the authorized agent of the project sponsor, I (undersigned) have reviewed the Initial Study for the Marin County Flood Control and Water Conservation District's Routine Maintenance Activities Program (RMA), and have particularly reviewed the mitigation measures and monitoring programs identified herein. I accept the findings of the Initial Study, including the recommended mitigation measures, and hereby agree to modify the proposed project application now on file with Marin County to include and incorporate all mitigation measures and monitoring programs set out in this Initial Study.

For _____ 2/16/2012 _____

Robert Beaumont; Director Date

VII. DETERMINATION: Pursuant to Sections 15081 and 15070 of the State Guidelines, the foregoing Initial Study evaluation, and the entire administrative record for the project:

[ ] I find that the proposed project WILL NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

[X] I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

[ ] I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Signature Rachel Warner Date 2/16/12

Printed Name Rachel Warner Date 2/16/12

ATTACHMENT A

MAPS OF PROJECT AREAS AND SPECIAL STATUS SPECIES

Please see Appendix C in Programmatic Approach to Routine Maintenance Activities document for the maps.

ATTACHMENT B
MASTER LIST OF MAINTENANCE SITES

Please see Appendix A in Programmatic Approach to Routine Maintenance Activities document for the maps.

ATTACHMENT C

MASTER LIST OF SEDIMENT REMOVAL SITES

Please see Appendix B in Programmatic Approach to Routine Maintenance Activities document for the maps.

APPENDIX H

PRE-WORK BIOLOGICAL SURVEY DATA SHEET

MCFCWCD WILDLIFE AND HABITAT ASSESSMENT SURVEY

Name:

Date:

Location/Project detail (including start date):

Start Time:
Weather/Wind/Cloud Cover:

End Time:
Weather/Wind/Cloud Cover:

Habitat Type:

Species or Signs (tracks, sound, etc.) Observed	**Burrows Observed (length x height) Possible species use**

Notes: (e.g. flagging tape, recommendations, things to avoid)

(Draw map on reverse if necessary or attach map)

Submit Original to Senior Planner, LMichl@marincounty.org

APPENDIX I

CREEK ASSESSMENT DATABASE

Creek Assessment Database Field Names and Allowable Values

Feature Type

Dead tree standing
Downed branches
Downed tree
Erosion
Invasive species
Low branches
Native species blocking flow
Natural debris
Single trunk cultivation
Other

Size

L
M
S

DivertWater

Yes
No

Recommendations

Trim
Remove
Refer/check
None
Monitor

Status

Resolved
Pending
Watch

Notes

(free-form)

AssessmentDate

(date)

ActionDate

(date)

LWD

Yes
No

APPENDIX J

PRE-PROJECT NOTIFICATION FORM

Appendix J
20XX Stream Maintenance Program
Pre-Project Notification Worksheet for Sediment Removal Sites

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1) **Site #:**
2) **Site Name:**
3) **Location Description:**
4) **Lat/Long:**
5) **Project Description:**
6) **Linear Feet of Work:**
7) **Area of Work (sq. ft./acres**):
8) **Estimated Sediment Removal Volume:**
9) **# of Work Days:**
10) **Equipment to be Used:**
11) **Equipment Location During Sediment Removal**:
12) **Heavy Equipment Access and Staging:**
13) **Temporary Stockpile Locations:**
14) **Dewatering Needed:**
15) **Coffer Dam Location:**
16) **Channel Description: Engineered (designed/modeled with specific flow capacity goal) or Other (modified or natural)**
17) **Tidal:**
18) **Vegetation/Habitat Types:**
19) **Geomorphic Conditions:**
20) **Sediment Issue Severity:**
21) **Chronic Sediment Issues:**
22) **Permits Needed:**
23) **Potentially Occurring Special Status Species:**
24) **Large Woody Debris to Be Removed:**
    If yes, analyze the LWD and include impacts:
25) **Trees to be removed?**
26) **Proposed Mitigation to off-set temporary and permanent Impacts:**
    If yes, can canopy forming trees help reduce maintenance and why not?
27) **Rationale of why this site work needs to be done this year:**
28) **Is there a Capital Improvement Project solution to alleviate the need to remove sediment in the future?**
29) **Have quantitative threshold been developed, and if so, have they been met (include channel**

morphology dimensions and channel calculations)?

30) **Technical basis for rock, if proposed:**

Attachments:

1. **Pre-Construction Photos:**
2. **Cross-sections or additional supporting material**

APPENDIX K

SITE SPECIFIC TRIGGERS

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
FLOOD CONTROL ZONE 1 - NOVATO						
1	1	1-AA-1	Arroyo Avichi	Novato Creek to culvert at Novato Blvd	Trim low branches in the active channel, maintain tide gate. Sediment removal downstream of Novato Blvd Bridge.	No floodplain, between houses. Manage vegetation for removing flow-diverting obstructions and bank stability. (N < ~0.04) Remove sediment from up to 150 feet downstream of the Novato Blvd Culvert when there is less than 3 feet of clearance to encourage sediment to flow out of the culvert. This should reduce the frequency of major sediment removal in Arroyo Avichi as part of the Novato Creek Maintenance Sediment Removal Project which has historically occurred every 4 years.
1	1	1-AA-2	Arroyo Avichi	US of bypass to 1575 Indian Valley Rd	Trim low branches in the active channel. Remove sediment and stabilize banks as needed.	Novato Creek hydraulic (RAS) model includes this location. No floodplain available. Ongoing complaint of bank stability threatening home; sediment is sometimes removed from opposite bank to relieve pressure on the eroding bank and reduce sediment accumulation in 1-BB-1.
1	1	1-ASJ-1	Arroyo de San Jose	Pacheco Pond to Hwy 101	Remove downed trees and branches, trim low branches in active channel. Trim emergent vegetation in the channel. Stabilize banks.	No Hydraulic Model. Floodplain n value exceeds 0.08 (light -medium brush).
1	3	1-ASJ-2	Arroyo de San Jose	Hwy 101 to silt basin US of Ignacio Blvd	Trim low branches and remove downed trees in the active channel. Remove sediment and stabilize banks as needed.	No Hydraulic Model. No floodplain available to handle out of bank flow without causing damage. Manage channel for Mannings n < ~0.045 (effective flow).

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
1	3	1-ASJ-3	Arroyo de San Jose	Ignacio Blvd to Birdie Dr	Trim low branches and remove downed trees in the active channel. Stabilize banks as needed.	No Hydraulic Model. Some floodplain available. Deeply incised. Manage for bank instability.
1	3	1-BB-1	Baccaglio Basin	Baccaglio Basin	Trim low branches and remove downed trees in the active channel. Remove sediment.	Remove sediment as needed to maintain low flow channel and positive drainage through basin.
1	1	1-BB-2	Baccaglio Basin	Baccaglio Bypass; Arroyo Avichi trash rack to Basin	Clean trash rack. Trim low branches and remove downed trees in the active channel.	Clear any debris on trash rack or likely to block flow.
1	1	1-CHE-1	Cheda Creek	Pump station	Maintain pump station.	Six-year cycle of maintenance.
1	1	1-CHE-2	Cheda Creek	Novato Blvd to Cowbarn Ln	Trim low branches and remove downed trees in the active channel. Stabilize banks as needed.	No Hydraulic Model. Cattails removed to prevent Novato Blvd culvert obstruction. A more defined trigger will be developed in the future when funding becomes available.
1	1	1-IGN	Ignacio Creek	Ignacio Blvd to College of Marin campus	Trim low branches and remove downed trees in the active channel. Stabilize banks as needed.	No Hydraulic Model. No floodplain, houses and development all along. Manange channel for Mannings n < 0.045 and bank stability.

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Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
1	3	1-LYC	Lynwood Creek	Off Rowland Blvd	Full root mass removal of cattails to restore a low flow channel. [Flows in this drainage go through Scottsdale Marsh and Lynwood Basin where water is filtered by extensive populations of cattails before being discharged through Lynwood Pump Staton into Novato Creek. There is no passive connection to Novato Creek or the Bay.] Trim low branches and remove downed trees in the active channel. Stabilize banks as needed.	No Hydraulic Model. Vegetation removed when it obstructs the channel more than the culvert at Rowland Blvd can handle.
1	1	1-LYS	Lynwood Slough	Behind Vintage Oaks Shopping Center	Trim cattails, maintain pump station, and remove sediment immediately upstream of pump station if sediment levels interfere with pump operation (infrequent, last done in 2009)	No Hydraulic Model. Vegetation removed when it obstructs the channel more than the culvert at Rowland Blvd can handle.
1	1	1-NMWD-1	Novato Creek	Novato Creek at Jim Grossi Ranch US of Stafford Lake	Sediment removal. Remove downed trees and branches.	The maintenance trigger is less than 2 ft of clearance between the sediment level and weir top.
1	2	1-NMWD-2	Trib to Stafford Lake	Tributary to Stafford Lake near Indian Valley Golf Course	Sediment Removal. Remove downed trees and branches.	The maintenance trigger is less than 2 ft of clearance between the sediment level and weir top.

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1	2	1-NOV-1	Novato Creek	Mouth to Redwood Blvd	Maintain pump station, tide gates, and levees. Note: A portion of sediment removal in this reach is part of the separately permitted Novato Creek Maintenance Sediment Removal project.	RAS Hydraulic Model exists. No Floodplain available. Constructed for Q50 but ~obs Q10 service. Manage channel for n < 0.03, margins < 0.04.
1	1	1-NOV-2	Novato Creek	Redwood Blvd to upper tidal extent	Remove downed trees and branches, trim cattails and pluck out select roots for maintaining a small low flow channel, and stabilize banks as needed.	RAS Hydraulic Model exists. No Floodplain available. Constructed for Q50 but ~obs Q10 service. Manage channel for N < 0.03, margins < 0.04. A low-flow channel less than 2 feet wide triggers need to pluck out cattail roots to allow for passage of fish and sediment through the reach. This should reduce the need for major sediment removal.
1	1	1-NOV-3	Novato Creek	Above tidal extent to Thorsen Ct	Remove downed trees and branches. Cattail management by plucking out the roots for a low flow channel and trimming the flanks.	RAS Hydraulic Model exists. No Floodplain available. Constructed for Q50 but ~obs Q10 service. Manage channel for N < 0.03, margins < 0.04. A low-flow channel less than 2 feet wide triggers need to pluck out cattail roots to allow for passage of fish and sediment through the reach. This should reduce the need for major sediment removal.

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1	2	1-NOV-SR	Novato Creek	Novato Creek Sediment Removal	Note: This is being implemented in summer 2020 through a separate permit, not part of this programmatic permit.	RAS Hydraulic Model exists. No Floodplain available. Constructed for Q50 but ~Q10 service. Manage channel for N < 0.03, margins < 0.04. Updated modeling in 2020 found benefits of sediment removal to be minimal so we are initiating a study of potential alternative projects to protect adjacent communities from recurrent flooding.
1	2	1-PAC-1	Pacheco Creek	Pacheco Pond to Hwy 101	Remove low/downed branches. Stabilize banks as needed.	No RAS model. Variable floodplain availability, low gradient. Manage for channel n < 0.04 and floodplain < 0.08 (medium/dense brush) where present.
1	3	1-PAC-2	Pacheco Creek	Hwy 101 to 99 Pacheco Creek Dr.	Remove low/downed branches. Stabilize banks as needed.	No RAS model. High gradient, incised, no foodplain manage for bank stability and channel n < 0.04.
1	3	1-PAC-3	Pacheco Creek NF	Parallel to Oak Forest Rd	Remove low/downed branches.	No RAS model. Following the flooding of two homes in the neighborhood last year, the system (consisting of a creek flowing into a 42" pipe through a series of inlets) was modeled in HY-8. The inlets, when clear of debris, allow a 10-year flow into the pipe which itself has 100-year capacity. In order to minimize flood risk, the creek upstream (within our easement) is cleared of debris and vegetation that may be loosened by high flows. Per CDFW request, District is developing potential CIPs to daylight the creek.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
1	3	1-RUSH	Rush Creek	N of Olive/Railroad to Binford Rd (excluding Caltrans ROW)	Trim willows in active channel. Trim emergent vegetation. Maintain tide gates. Remove sediment as needed (waiting for modeling to confirm effectiveness).	No RAS model. Local businesses frequently express concern about this drainage. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows. District is working with local partners (City, Transportation Authority of Marin, Caltrans) to secure funding for a watershed study that leverages the existing stormdrain model completed by the City of Novato and new Countywide LiDAR terrain data. This will refine maintenance triggers in the future.
1	1	1-RUSH-2	Rush Creek	CalTrans ROW US of County work	Trim willows in active channel. Trim emergent vegetation.	No RAS model. Local businesses frequently express concern about this drainage. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows. District is working with local partners (City, Transportation Authority of Marin, Caltrans) to secure funding for a watershed study that leverages the existing stormdrain model completed by the City of Novato and new Countywide LiDAR terrain data. This will refine maintenance triggers in the future.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
1	1	1-RUSH-3	Rush Creek	CalTrans ditch along 101 into Rush Ck.	Trim willows in active channel. Trim emergent vegetation.	No RAS model. Local businesses frequently express concern about this drainage. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows. District is working with local partners (City, Transportation Authority of Marin, Caltrans) to secure funding for a watershed study that leverages the existing stormdrain model completed by the City of Novato and new Countywide LiDAR terrain data. This will refine maintenance triggers in the future.
1	1	1-SIMM	Simmons Slough	Simmons Slough	Maintain pump. Sediment Removal. Note: replacement of the pump is permitted as part of Simmons Slough Water Management Project in summer 2020.	Sediment removal as needed to maintain positive drainage to pump station and protect pump operations,
1	2	1-SMC	San Marin Creek	Between Leese Ln and Driftwood Ave	Remove low/downed branches.	No floodplain, between houses. Manage for removing flow-diverting obstructions and bank stability. (n < ~0.04).
1	1	1-SRC	San Ramon Creek	Between shopping center and Poplar Dr	Remove low/downed branches. Clean trash rack.	No Model. Headwater tributary. Vegetation managed to keep culvert inlet clear.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
1	1	1-VIN	Vineyard Creek	US to 2590 Vineyard Rd	Trim branches and emergent vegetation in active channel. Remove sediment and stabilize banks as needed. Remove weeds and invasive species in order to protect the section that was planted with native riparian vegetation in 2009.	Much of this reach is immediately adjacent to low-lying residential properties. Following flooding in 2006, about 3,000 linear feet of channel (also includes parts of 1-WAR-3) was laid back and/or configured to have a floodplain terrace. Fish passage was improved and native vegetation was planted in the riparian corridor compatible with the Manning's N values in the HEC-RAS model that was created to support the design (50-year flow capacity). The pictograms (Section 5.2) in the SMP Manual are also show when maintenance needs to occur as this section is complex and hard to have one trigger.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
1	1	1-WAR-1	Warner Creek	Novato Creek to Diablo Ave	Trim branches and emergent vegetation in the active channel. Pluck select cattail roots to maintain a small low flow channel. Stabilize banks as needed. Note: This reach is part of the separately permitted 2020 Novato Creek Maintenance Sediment Removal project.	Novato Creek hydraulic (RAS) model includes this location. No floodplain available and low lying homes are adjacent. Constructed for Q50 but ~Q10 service. Manage channel for n < 0.03, margins < 0.04. Updated modeling in 2020 found benefits of sediment removal to be minimal so we are initiating a study of potential alternative projects to protect adjacent communities from recurrent flooding. A low-flow channel less than 2 feet wide triggers need to pluck out cattail roots to allow for passage of fish and sediment through the reach. This should reduce the need for major sediment removal.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
1	1	1-WAR-2	Warner Creek	Diablo Ave to confluence with Vineyard Creek	Remove low/downed branches. Trim emergent vegetation. Stabilize banks as needed.	Much of this reach is immediately adjacent to low-lying residential properties. Following flooding in 2006, about 3,000 linear feet of channel (also includes parts of 1-VIN) was laid back and/or configured to have a floodplain terrace. Fish passage was improved and native vegetation was planted in the riparian corridor compatible with the Manning's N values in the HEC-RAS model that was created to support the design (50-year flow capacity). The remainder of this reach was part of the Novato Creek Flood Control Project Phases IV through VII, which was built in response to extensive flooding in 1982, also with a goal of providing 50-year flow capacity. The pictograms (Section 5.2) in the SMP Manual are also show when maintenance needs to occur as this section is complex and hard to have one trigger.
1	1	1-WIL	Wilson Creek	Warner Creek confluence to 630 Wilson Ave	Remove low/downed branches. Stabilize banks as needed.	Lower half-mile are included in Novato Creek hydraulic model. Manning's N vaules are 0.035 for channel and 0.08 over bank. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed so they are unlikely to block flows in this residential reach.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
FLOOD CONTROL ZONE 3 - RICHARDSON BAY						
3	4	3-ACMP-1	Arroyo Corte Madera del Presidio	Camino Alto to La Goma St	Remove low/downed branches.	Minimal Floodplain available. Model floodplain mannings n = 0.1, Manage for channel n value < 0.03.
3	4	3-ACMP-2	Arroyo Corte Madera del Presidio	Warner to Old Mill Cr	Remove low/downed branches.	Minimal Floodplain available. Model floodplain mannings n = 0.1, Manage for channel n value < 0.03.
3	4	3-ACMP-3	Arroyo Corte Madera del Presidio	Sunnyside Bridge to 650 W. Blithedale Ave	Remove low/downed branches.	Minimal Floodplain available. Model floodplain mannings n = 0.1, Manage for channel n value < 0.03.
3	4	3-BM	Bothin Marsh	E. Blithedale Ave at Roque Moraes Dr	Remove downed branches and sediment from drainage ditch.	Sutton Manor outfall into marsh. Debris removed to prevent culvert obstruction and backwatering.
3	4	3-CAS	Cascade Creek	From Cascade Dr upstream approximately 600 ft	Remove low/downed branches.	Removal of major flow-diverting obstructions only.
3	4	3-COY-1	Coyote Creek	Coyote Creek Sediment Removal Hwy1 to DS end of concrete channel	Removal of accumulated sediment to restore design cross section. Maintain pump stations, tide gates, and levees. Stabilize banks as needed.	The HEC-RAS model for this creek is updated periodically. Most recent modeling shows that removing sediment would increase the freeboard to USACE standards, but this is not justified by the high cost of construction given flooding of structures would not be impacted.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
3	5	3-COY-2	Coyote Creek	Start of concrete channel to Laurel Way	Removal of accumulated sediment to restore design cross section. Maintain tide gates. Stabilize banks as needed.	When updated surveying and HEC-RAS modeling for this creek indicates creek overtopping during the USACE 20-year design event sediment removal is triggered.
3	5	3-COY-3	Coyote Creek	Laurel Way to US of Ash St	Removal of accumulated sediment to restore design cross section. Maintain tide gates. Stabilize banks as needed.	When updated surveying and HEC-RAS modeling for this creek indicates creek overtopping during the USACE 20-year design event sediment removal is triggered.
3	5	3-COY-4	Coyote Creek	North fork inlet between Ash St and Maple Ave	Removal of accumulated sediment to restore design cross section.	When updated surveying and HEC-RAS modeling for this creek indicates creek overtopping during the USACE 20-year design event sediment removal is triggered.
3	5	3-COY-5	Coyote Creek	South fork inlet	Removal of accumulated sediment to restore design cross section. Trim/remove low/downed branches.	When updated surveying and HEC-RAS modeling for this creek indicates creek overtopping during the USACE 20-year design event sediment removal is triggered.
3	5	3-CRE-1	Crest Marin Creek	Flamingo Rd to Ross Dr	Sediment is removed to restore a low flow channel and positive drainage path. Maintain pump station and tide gates.	When there is significant build-up of sediment that it is observed during the winter that it doesn't effectively reach the pump station, sediment removal is triggered to protect the neighborhood.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
3	5	3-CRE-2	Crest Marin Creek	End of Laurel Way	This reach was designated as an easily accessible location to remove accumulated sediment, while eliminating the need to remove sediment in more sensitive areas of the creek. The removal of sediment is considered beneficial in that it reduces the burial of native vegetation by excessive sediment loads and prevents the creek from going sub-surface through the accumulated sediment.	Sediment is removed when it has filled the sediment basin to the point that drainage facilities are beginning to become buried, which threatens to undermine flood control management in this neighborhood.
3	5	3-MIL-1	Miller Ave drainage	Just S of Miller Ave/Camino Alto intersection	Remove accumulated silt from roadside concrete ditch.	With the 2017 repair of the tide gate at the downstream end it is anticipated that sediment removal will not be triggered as long as it remains in working condition.
3	5	3-MIL-2	Miller Ave drainage	E side of Miller Ave across from Tamalpais HS	Remove accumulated sediment from earthen roadside drainage ditch.	Maintain design cross section of roadside ditch.
3	5	3-MIL-3	Miller Ave drainage	Across from Tamalpais HS track between Miller Ave and Bothin Marsh multiuse path	Remove accumulated sediment from earthen roadside drainage ditch.	Maintain design cross section of roadside ditch.
3	5	3-MRN	Marin City drainage	Trash racks	Removal of debris from trash racks.	Any debris on the trash racks is removed to prevent flooding of structures in the vicinity.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
3	5	3-NYH-1	Nyhan Creek	Enterprise Concourse to Headlands Ave	Removal of sediment is considered beneficial in that it reduces the burial of native vegetation by excessive sediment loads and prevents the creek from going sub-surface through the accumulated sediment. Non-native vegetation is also removed.	The Enterprise Concourse bridge is a hydraulic restriction, and any accumulation of sediment beneath and in the vicinity could increase the risk of flooding.
3	5	3-NYH-2	Nyhan Creek WF	Channel behind Tamalpais Valley Elementary School	Trash common to elementary schools and accumulated sediment within this concrete ditch are removed.	When there is significant build-up of sediment in the concrete ditch it needs to be removed in order to reduce the risk of flooding at the school and/or Tennessee Valley Road. High water marks are evaluated in the spring and if the prior winter nearly overtopped the ditch and sediment has accumulated it is considered significant.
3	5	3-NYH-3	Nyhan Creek tributary	Along Tamalpais Valley Community Center	Remove low/downed branches.	No Hydraulic Model. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows in this reach with ajacent residences and businesses.
3	5	3-OMC	Old Mill Creek	Ethel Ave to 550 Cascade Dr	Remove low/downed branches.	Hydraulics modeled as part of Arroyo Corte Madera Del Presidio. Manage for Manning's n < 0.035 in channel (low roughness) over bank modeled as n = 0.1 (very dense brush).

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3	4	3-REED-1	Reed Creek	ACMP confluence US approximately 200 ft	Remove low/downed branches.	No Hydraulic Model. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows in this reach with ajacent residences and businesses.
3	4	3-REED-2	Reed Creek	300 ft US of Miller Ave to Tamalpais Ave	Remove low/downed branches.	No Hydraulic Model. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows in this reach with ajacent residences and businesses.
3	4	3-RSD	Robin-Starling Ditch	Approximately 525 ft from Coyote Cr US to just past Robin Rd	Remove low/downed branches.	No Hydraulic Model. Plants and debris in the active channel that have potential to increase capture of additional debris or sediment are being trimmed, so they are unlikely to block flows in this reach with ajacent residences and businesses.
3	5	3-RYC-1	Ryan Creek	~150 ft upstream of Camino Alto and under road	Remove low/downed branches.	Ryan Creek RAS model. Manage for channel mannings n < 0.045, margins 0.1.
3	4	3-RYC-2	Ryan Creek	Ryan Ave circle to Amicita Ave	Remove low/downed branches.	Ryan Creek RAS model. Manage for channel mannings n < 0.045, margins 0.1.
3	4	3-SEM	Pump station at Seminary Drive	Pump station at Seminary Drive	Maintain pump station and flap gate. No sediment or vegetation maintenance typically needed.	Pump station and tidegate maintenance.

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ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
3	5	3-SUT-1	Sutton Manor	Roque Moraes Dr just S of E. Blithedale Ave	Remove sediment.	Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.
3	4	3-SUT-2	Sutton Manor	Roque Moraes Dr to Ashford Ave	Remove low/downed branches and sediment.	Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.
3	4	3-SUT-3	Sutton Manor	Ashford Ave to Dorset Ln	Remove low/downed branches and sediment.	Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.
3	4	3-SUT-4	Sutton Manor	Dorset Ln to Shell Rd ditch	Remove low/downed branches and sediment.	Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.
3	4	3-SUT-5	Sutton Manor	Shell Rd ditch parallel to Shell Rd	Remove low/downed branches and sediment.	Drainage ditches, unmodeled, no floodplain, manage for Manning's n < ~0.04 (rough channel but not diverting flow). Sediment is removed to eliminate high points in the longitudinal profile.
3	4	3-SUT-6	Sutton Manor	Trash rack at Vasco Ct	Remove debris from trash rack.	Drainage ditches, unmodeled, no floodplain, manage for n < 0.04.
3	4	3-WAR	Warner Canyon Creek	200 ft DS of Blithedale Bridge to 100 ft DS of Vista Linda Bridge	Remove low/downed branches.	High gradient, unmodeled.

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FLOOD CONTROL ZONE 4 - BEL AIRE AND STRAWBERRY CIRCLE						
4	6	4-EAST-1	East Creek	From Tiburon Blvd US to tidal extent (approx 350 ft)	Trim cattails.	Hydraulic RAS model exists. Manage for Mannings n < 0.02 in the most constrained sections. No floodplain available.
4	6	4-EAST-2	East Creek	DS of Cecilia Way; ditch from Cecilia Way upstream to end of Karen Way	Trim cattails. Trim low branches in active channel, and remove downed branches.	Hydraulic RAS model exists, prone to flooding from 10-year event. Manage for Mannings n < 0.02 in the most constrained sections. No floodplain available.
4	6	4-SALT	Salt Works Canal	DS of Tiburon Blvd	N/A	Canal is not in District right-of-way so will not be maintained as part of SMP.
4	6	4-STR	Strawberry Circle levee and ditch	On Mill Valley school property	Remove major obstructions and mow levee top for access and fire fuel. Ensure flap gate seals.	No model exists. The ditch is flat and can only drain at high tide. It is important for the adjacent homes that the tide gate function as they are lower than very high tides. Vegetation must be maintained on the levee to allow regular access to inspect the tide gate and any objects should be removed from the ditch so they don't get stuck in the tide gate.
4	6	4-WEST-1	West Creek	From Tiburon Blvd US to tidal extent (approx 425 ft)	Trim low branches in the active channel and remove downed branches. Remove invasive plants. Remove sedment from downstream of Cecilia Way bridge.	HEC-RAS model exists. The active channel roughness coefficient used was 0.035. An overbank roughness coefficient of 0.09 was used for densely vegetated and overbank areas. Maintain this state. Remove sediment from downstream of Cecilia Way bridge when freeboard under bridge is less than 3 feet (as modeled).

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4	6	4-WEST-2	West Creek	From tidal extent US to Via Los Altos and a 100 ft section US of Reedlands Woods Way	Trim low branches in the active channel and remove downed branches. Remove invasive plants.	HEC-RAS model exists and area is prone to flooding from 10-25 year events. The active channel roughness coefficient used was 0.035. An overbank roughness coefficient of 0.09 was used for densely vegetated and overbank areas. Maintain this state.
FLOOD CONTROL ZONE 5 - STINSON BEACH						
5	10	5-EAS-1 (a-e)	Easkoot Creek	Calle del Ribera to Calle de Pinos	Trim willows. Remove invasives and debris from wetland.	Manage for Mannings n < 0.04, no floodplain available until ds of Calle del Arroyo clear floodplain to n < 0.08 medium brush.
5	10	5-EAS-2	Easkoot Creek	Geomorphic channel on NPS land	Vegetation maintenance and sediment removal.	Manage for Mannings n < 0.04, no floodplain available.
5	10	5-EAS-3	Easkoot Creek	250 ft DS of Arenal Ave to 200 ft US of Hwy 1	Vegetation maintenance and sediment removal.	Manage for Mannings n < 0.04, no floodplain available.

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FLOOD CONTROL ZONE 7 - SANTA VENETIA						
7	6	7-CAS	Castro Ditch	Between Vendola Dr and Mabry Dr	Remove low/downed branches, invasive species, and sediment. Fire fuel reduction, vegetation maintenance and sediment removal.	Plants and debris in the ditch, that have potential to increase capture of additional debris or sediment, are being trimmed so they are unlikely to block flows in this reach and cause flooding to adjacent residences. Residents express frequent concerns about drainage here.
7	6	7-EST	Estancia Ditch	Pump Station 4 to Pump Station 5	Mostly pump station and levee maintenance is conducted here. Due to extremely flat slope sediment removal does not seem effective.	There is a HEC-RAS model for this ditch. There ditch is extremely flat and there is not a consistent positive slope to the pump station. Obstructions are removed, but portable pumps are still needed.
7	6	7-GAL	Gallinas Creek South Fork	South Fork; Behind Vendola Dr from Meadow Way to Pump Station 5	Fire fuel reduction, vegetation maintenance, erosion control, levee maintenance and pump station maintenance.	Vegetation management is not conducted within the channel here. Sediment removal is not needed for flood control based on a 2014 study, but any navigational dredging would be permitted under a project specific permit for the Gallinas Creek Geomorphic Dredge Project (CSA 6).
7	6	Removed from SMP in 2021 7-LAP-1	Gallinas Creek South Fork	La Pasada Way intersection with Vendola Dr	Tide gate maintenance, and formerly sediment removal.	Sediment would be removed here if it rendered the rubber check valve at the end of this pipe inoperable. In 2014 a project to slip-line the storm drain pipe and extend it out to the deeper and more geomorphically stable section of the creek appears to have been effective thus far in preventing the need for sediment maintenance here.

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7	6	7-LAP-2	Gallinas Creek South Fork	La Pasada Way intersection with N. San Pedro Rd	Sediment removal from within a storm drain pipe under a road.	This is the responsibility of Road Maintenance, not the District, and is conducted within the road with a vactor truck each fall and as needed.
7	6	7-MAB	Mabry Ditch	Between Mabry Way and Birch Way	Trim low/downed branches/trees, remove sediment, trim emergent vegetation. A slide gate is maintained here annually.	No model. Relatively flat. Very little space between ditch and adjacent homes. Maintain positive drainage to either end (splits ~midway).
7	6	7-MCPH	Berm behind Sunny Oak	McPhail School berm on west side of property N of N. San Pedro Rd	This is not the responsibility of the District.	
7	6	7-MEA-1	Gallinas Creek South Fork	Meadow Way Interceptor Outlet; end of Meadow Way at Gallinas Creek	Tide gate maintenance, portable pump operation, and formerly sediment removal.	Sediment removal here in 2010 was conducted, but it immediately returned to an equiplibrium condition more than half full. This is due to high sediment levels in the creek. When the Gallinas Creek Geomorphic Dredge Project (not a District project) is completed, removal of sediment here should be conducted in conjunction.

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
7	6	7-MEA-2	Gallinas Creek South Fork	Meadow Way Interceptor Inlets; 294 N San Pedro Rd and 308 San Pedro Ct	Remove/trim downed or low branches from the channel. Clean trash rack and remove sediment from the trap within the structure.	This is a site where the creek flows through a trash rack into an underground drain that bypasses the community directly adjacent to Gallinas Creek. When the trash rack becomes clogged with debris, it has caused flooding on North San Pedro Road, a critical access road to and from this community. In order to minimize this risk, the area within our easement is cleared of debris and vegetation that may be loosened by high flows.
7	6	7-PS-1	Gallinas Creek South Fork	Vendola Dr Pump Stations 1-5 and 2 portables	Pump maintenance.	Wet wells are cleaned annually if there is sediment accumulated.
7	6	7-PS-2	Gallinas Creek South Fork	Pump Station #4 detention basin	Remove cattails in pump station intake pond.	2014 PCSWMM model of the entire Santa Venetia drainage system indicated the Pump Station 4 watershed has at least 14 homes likely to have flooded living spaces in a 10-year storm. Keeping the engineered earthen basin at the inlet of the pump station clear of vegetation is needed to keep the flood risk at a minimum.

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
7	6	7-SOD	Gallinas Creek South Fork	Sunny Oaks Drain; NW of E. Vendola Dr intersection with N. San Pedro Rd	Sediment removal.	This is a roadside ditch that drains to a large storm drain that outfalls in Santa Venetia Marsh through a flap gate. When the channel is choked with cattails and sediment has accumulated in the roots its removal is triggered. This prevents flooding of low lying homes and preserves passage on N. San Pedro Rd.
FLOOD CONTROL ZONE 9 - ROSS VALLEY						
9	11	9-BOTH	Bothin Creek	Fairfax Cr to Bothin Rd.	Remove/trim downed or low branches from the channel.	Small unmodeled tributary between and under houses. No floodplain. Manage to prevent obstructions.
9	9	9-CCT	Larkspur Creek	10-14 College Ave		Manage to retain a low flow channel and removing major obstructions.
9	7	9-CMC-1	Corte Madera Creek	Mouth to stilling basin;	Sediment removal, levee maintenance, tidegate maintenance, bank stabilization.	Due to the benefit not outweighing the cost, a study was conducted on the feasibility of conducting a geomorphic dredge there. It still did not outweigh the cost so it was recommended not to remove sediment in this reach at this time.
9	7	9-CMC-2	Corte Madera Creek	concrete channel outfall US to tidal limit;	Sediment removal, tidegate maintenance, bank stabilization.	Due to the benefit not outweighing the cost, a study was conducted on the feasibility of conducting a geomorphic dredge there. It still did not outweigh the cost so it was recommended not to remove sediment in this reach at this time.

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
9	7	9-CMC-3	Corte Madera Creek	Concrete channel fish resting pools only	Sediment removal, tidegate maintenance, bank stabilization, remove low/downed branches/trees.	Resting pools are cleared of sediment when no longer usable to fish.
9	7	9-CMC-4	Corte Madera Cr	Lagunitas Bridge to Ross Cr	Sediment removal, remove low/downed branches/trees, bank stabilization.	Manage to retain a low flow channel and removing major obstructions.
9	7	9-FAIR	Fairfax Creek	From San Anselmo Cr to Sunnyside Nursery	Remove/trim downed or low branches from the channel.	RAS Model has channel n values ~ 0.05, intermittant floodplain and overbank flow 0.1. Very rough and dense brush. Manage for removal major flow-diverting obstructions.
9	9	9-LAD	Laurel Ave ditch	Ditch in backyards	Remove/trim downed or low branches and sediment from the channel.	Manage to retain a low flow channel and removing major obstructions.
9	7	9-LAR-2	Larkspur Creek	Above tidal extent to end of Madrone Ave	Remove/trim downed or low branches and sediment from the channel.	Manage to retain a low flow channel and removing major obstructions.
9	7	9-MAG-1	Larkspur Creek	1100 Magnolia Ave	Trim cattails and remove sediment.	Pending City input.
9	7	9-MAG-2	Larkspur Creek	1028 Magnolia Ave	Trim cattails and remove sediment.	Pending City input. Maintenance triggers will be developed once funding can be secured. There is no timeline yet, when that funding will become available.
9	7	9-MAG-3	Larkspur Creek	965 Magnolia Ave	Remove sediment that accumulates generally every year blocking the outfall of these culverts.	Sediment removal triggered when either the outfall pipes become 50% or more occluded, or when the channel thalweg between the pipe outfall and the downstream pipe crossing does not have a continuous gradient.

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
	7	9-MAG-4	ditch flows into Larkspur Ck	600 Magnolia Ave.	Remove sediment that accumulates generally every year blocking the outfall of these culverts.	Sediment removal will be triggered when either the outfall pipes become 50% or more occluded or when the channel thalweg between the pipe outfall and the downstream pipe crossing does not have a continuous gradient.
9	7	9-MUR	Murphy Creek	Murphy Creek culvert at Kent Ave US to Ross	Remove/trim downed or low branches and sediment the channel.	Unmodeled low gradient tributary. Manage to retain a low flow channel and removing major obstructions.
9	7	9-ROS	Ross Creek	mainstem to Glenwood	Remove/trim downed or low branches from the channel.	RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).
9	7	9-SAC-1	San Anselmo Cr	Ross Creek to SA border	Remove/trim downed or low branches from the channel.	RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).
9	8	9-SAC-2	San Anselmo Cr	Within Town of SA	Remove/trim downed or low branches from the channel.	RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).
9	8	9-SAC-3	San Anselmo Cr	Within Town of Fairfax	Remove/trim downed or low branches from the channel.	RAS model exists downstream of Fairfax Creek confluence. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows)
9	8	9-SHC-1	Sleepy Hollow Creek	San Anselmo Cr to town limit	Remove/trim downed or low branches from the channel.	RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
9	9	9-SHC-2	Sleepy Hollow Creek	San Anselmo town limit to Van Winkle Cr	Remove/trim downed or low branches from the channel.	RAS model exists. Inset channel without floodplain. manage channel for Mannings n < 0.05 (rough but not diverting flows).
9	9	9-SHC-3	Sleepy Hollow Creek trib	300 Hidden Valley Ln	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-SHC-4	Sleepy Hollow Creek	960 Butterfield Rd / Green Valley Ct	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-SHC-5	Sleepy Hollow Creek	Butterfield Rd / Sleepy Hollow Dr bridge	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-SHC-6	Sleepy Hollow Creek	Katrina Ln	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-SHC-7	Sleepy Hollow Creek	Van Winkle Dr culvert	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-SOR	Sorich Creek	3500 ft US of SA Cr	Remove/trim downed or low branches from the channel.	Small, narrow, unmodeled tributary. Floodplain = backyards. Manage channel mannings n < 0.05 (remove major obstructions).
9	9	9-VAN-1	Van Winkle Creek	Sleepy Hollow Cr to 275 Van Winkle	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-VAN-2	Van Winkle Creek	Ichabod Ct culvert	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
9	9	9-VAN-3	Van Winkle Creek	Tappan Rd culvert	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-VAN-4	Van Winkle Creek	Mather Rd culvert	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-VAN-5	ditches to Van Winkle Creek	155 and 201 Van Winkle Drive	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-VAN-6	Van Winkle Creek	Manitou Dr culvert	Remove/trim downed or low branches from the channel.	Not modeled. Trigger vegatation removal when channel obstructs culvert conveyance.
9	9	9-WARD	Larkspur Creek	Outfall from city parking lot across from 25 Ward St	Full root mass removal of cattails which are blocking the culvert immediately upstream and increasing sedimentation.	Triggered when the cattails obstruct flow through the ditch beyond the conveyance capacity of the upstream and downstream culverts.

Appendix K - Site Specific Triggers

Marin County Flood Control Water Conservation District - Stream Maintenance Program

ZONE	Map #	Site ID	CREEK	LOCATION DESCRIPTION	TYPICAL IMPACTS and/or BENEFITS TO AQUATIC RESOURCES	MAINTENANCE TRIGGER
COUNTY SERVICE AREA 13 - UPPER LUCAS VALLEY						
CSA-13	6	CSA-13-MC	Miller Creek	Dixie Elementary and Miller Creek Middle	Remove/trim downed or low branches from the channel.	This creek is through a neighborhood that flooded in recent years due to debris in the creek. We remove debris and vegetation in the active channel that could lead to further accumulation of debris and sediment.

APPENDIX L

FDS LWD MANAGEMENT PLAN



Floated Debris from Girl Scout Camp on Upper Fairfax Creek (July 25, 2019)

Large Wood Debris Management Plan Recommendations for Fairfax Creek at the Sunnyside Flood Diversion and Storage (FDS) Facility

Fairfax, California

December 2019



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1.0 Study Purpose

The purpose of this recommended large wood debris management plan is to provide technical background and outline practical assessment and information for the Marin County Flood Control and Water Conservation District (District) to consider in adopting a Large Wood Debris Management Plan (LWDMP) for properly managing risk to the FDS basin performance posed by wood expected to naturally float into the basin site from the Fairfax Creek watershed upstream.

2.0 Recommended Large Wood Debris Management Plan Measures

- Large Wood Piece Size Reduction. District implements pre-project, annual, and post-high flow monitoring of the 1,500-foot-long Management Reach downstream from the Baywood Canyon Road culverts to implement low-cost, minimum environmental impact, targeted piece size reduction for reducing or eliminating over time the number of large wood pieces that high flows would potentially mobilize and float into the basin during operations. The target-size large wood pieces are live upright, live-down, and dead-down trees that are between 18- and 36-feet-long. There are about 40-50 target-size pieces in the Management Reach. Most of the target-size pieces are live upright bay trees. Most of the remainder pieces are live-down but still rooted bay trees. Live upright and down bay trees can be severely pruned or topped without killing the tree. The recommended work is similar to “annual creek walk” and “creek clean-up” activities already routinely implemented by the County and municipalities on public and private properties in the same watershed.

Large Wood Retention Structure. District installs two columnar bollards spaced +/- 12-18 feet apart on the bed of Fairfax Creek along a cross-section within County property to catch large

floated wood debris (i.e., retention structure) upstream from the Sunnyside flood diversion and storage (FDS) basin weir, where the District may remove caught debris using crane or large excavator equipment.

3.0 Summary Findings for Technical Background

Potential Impacts to FDS Basin Operations. Small wood floated into the site during normal winter high flows is expected to pass safely through the diversion structure's 18-foot-wide gated culvert opening. During moderate floods not triggering basin operation, large wood debris floated into the site – i.e., longer than 18-feet-long – has the potential to come to rest at the gated culvert inlet. During high flow events triggering basin operation, small wood debris is expected to pass safely through the gated culvert and over the basin weir into the basin and over the dam spillway crest into Fairfax Creek downstream from site. However, should a large "key" wood piece float into backwatered site and lodge on the 200-foot-long basin weir or the 95-foot-long spillway, it could collect smaller floated wood pieces to form a wood jam that would potentially, by blockage, impact the basin's design hydraulic performance during actual future operations. This study does not evaluate potential hydraulic performance impacts for a range of basin weir and/or spillway blockage widths. Rather, it is assumed that a significant blockage of either or both the basin weir and/or spillway would substantially affect basin's design performance, thereby not reducing flood risk in downstream floodprone areas as much as it would in the absence of blockage by wood debris.

Natural Wood Debris Dynamics at the FDS Basin Site. The 4.1-km^2 (1.58-mi^2) Fairfax Creek watershed upstream from the Sunnyside basin site (site) exports relatively large volumes small wood and much lesser volumes of large wood by floating during intermittent and ephemeral flows through 18.2 km (11.3 mi) of channels (Figure 1). A three-year peak flow (Q_3) in December 2012 deposited 230 m^3 (300 cubic yards) of primarily small wood upstream from the 8-foot-diameter circular culvert at Glen Drive (Lockaby, 2019). Similar volumes of

small wood debris are expected to enter the site during small floods, and much greater volumes during large floods. It is more difficult to estimate the threshold of movement and potential volume of large pieces – i.e., longer than 18-feet-long – entering the site. Large wood is not expected to pass through the 6-ft-wide and 12-ft-wide culverts under Baywood Canyon Road – large wood pieces may only yield from the "Management Reach" that is downstream from the Baywood Canyon Road culverts (Figure 1). Within this approximately 1,500-foot-long reach of mainstem Fairfax Creek, large wood may be exported to the site during high flows by mobilization of existing large down-live or down-dead wood in the stream, or of new large wood entering the reach during high flows by new bank erosion, tree toppling, or tree wind-throw. Field observations suggest several of the existing large live-down and dead-down pieces in the Management Reach probably entered the creek and/or were mobilized downstream but did not move completely through the management reach during the December 2005 flood. It is unknown what number of large pieces may have mobilized into and/or all the way through the basin site during that flood. It is notable that many of the large down pieces have already been reduced in size by chainsaw cutting. Large wood pieces longer than 36 feet – i.e., two times the estimated "bankfull" width – are considered too large to be mobilized and exported to the site during high flows. There are probably about 40-50 pieces of wood between 18- and 36-feet-long in the management reach, almost entirely comprised of existing upright live trees rooted on banks and adjacent top of bank areas.

Risk Management and General Recommendations. The risk to the basin's hydraulic and safety performance posed by these 40-50 live upright, live-down trees, and dead-down trees cannot be accurately estimated. There are not reliable methods for estimating what "threshold" flood peak flow would be high enough to move the existing down large wood pieces into the site, or be high enough to trigger widespread bank erosion to put a number of existing upright trees in the flood flowing creek, or then possibly floating them into the site. Neither are there reliable methods for modeling the potential for large pieces floating into the site to come to

rest on the basin weir, spillway crest, or gated culvert opening. Potential for lodging of one "key" large wood pieces on the facilities to then gather enough other wood debris to substantially reduce basin performance is also not predictable. The premise of this study is that wood debris floated into the site poses a risk because of its potential to reduce basin performance. Findings summarized above suggest that natural wood debris export to the site poses a low, possibly negligible level of risk during small and moderate floods, and a higher of risk during large floods. The risk is possibly significant during very large floods.

Accordingly, the recommended management measures are selected for reducing the potential for large wood pieces to enter the basin site during moderate to large floods. Perhaps the first priority is to implement a large wood piece size reduction program for reducing and possibly eliminating over time the number of estimated problem-sized pieces that have a reasonable potential to be mobilized into the site during moderate to large floods. Another effective and "fail-safe" measure would be to install a retention structure – i.e., row of widely spaced columnar steel bollards along a creek cross-section – to catch only large sized floated wood pieces before they enter the site during floods.

Both of these recommended management measures would entail environmental impacts that may not have been quantified and analyzed by the SAFRR Project EIR. The recommended piece size reduction work would occur on private property. The recommended retention structure would be located entirely within County property. These and other specific considerations for implementing both of the recommended measures are outlined in the below sections of this report.

The District may elect to implement one or both of the recommended management actions to reduce risk posed by movement of wood debris into the FDS Basin site by an amount that

balances initial and ongoing implementation costs with the estimated value of risk reduction. In general, the District is recommended to consider implementing an aggressive version of the piece size reduction work on upstream private property if it elects not to install the recommended "fail-safe" retention structure. Similarly, should the District elect not to implement the recommended piece size reduction work, perhaps, for example, because of the work needing to occur on private property, then it should more strongly consider installing the retention structure. Implementing both measures would achieve the higher level of risk reduction.

4.0 Recommended Measure 1: Large Wood Piece Size Reduction

This plan recommends that the District implement piece size reduction work as its primary large wood debris management measure. The work includes work pre-project, annual dry season, and as-needed post-flood wet season maintenance work throughout the 1,500-foot-long management reach. In each maintenance work session, all live upright trees, and live-down and dead-down tree debris and large wood pieces in the 18- to 36-foot-long target-size range that are in the creek or within 10 feet landward from the top of bank will be documented. Selected pieces would be chainsaw-cut into two or more pieces not each not more than 12-feet-long, according to selection criteria for meeting as applicable any environmental permit conditions, landowner requirements and preferences, professional judgement and other factors. Appendix A provides an inventory of all large dead wood pieces and Appendix B provides an inventory of both dead and live wood pieces occurring within the bankfull channel of the study reach. This July 2019 inventory listing the diameters and lengths of existing live and dead pieces in the part of the management reach upstream from the FDS basin site.

Landowner cooperation. The bed and banks of Fairfax Creek in the Management Reach occurs on multiple private properties. Tree and debris cutting work would require permission

from the individual landowner. Many of the existing live-down and dead-down large wood debris pieces have been chainsaw-cut, so it appears likely that most of the affected landowners would cooperate with the District to implement work that is similar to what they have been undertaking themselves or hiring contractors to implement.

Avoid and Minimize Habitat Impacts. Most of the estimated 40-50 target-size large wood pieces are live upright bay trees. Most of the remainder pieces are live-down bay trees still rooted to the bank. Fewer are dead-down bay and maple trees. Live upright and down bay trees can be severely pruned or topped without killing the tree. The recommended work is similar to "annual creek walk" and "creek clean-up" activities already routinely implemented by the County and municipalities on public and private properties in the same watershed. Ongoing routine tree and debris pruning and removal work occurs in perennial, steelhead-bearing sections of the creek in the downstream part of the watershed. Fairfax Creek does not provide quality steelhead habitat, and access to Fairfax Creek is prevented by 500+-foot-long bypass box culvert between Bolinas Avenue and receiving San Anselmo Creek. The Management Reach dries up early each spring. Piece size reduction work can be completed without substantially reducing the supply of large wood debris in Fairfax Creek downstream from the FDS basin site either by leaving reduced-size pieces on the creek bed and banks in the Management Reach for natural movement through to downstream from the basin, or by removing pieces from the channel and placing them in the channel downstream from the basin site.

Mitigate Unavoidable Impacts. Any tree mortality or tree removal caused by the work may need to be mitigated, such as by compensatory riparian tree container plantings, if feasible considering the shady conditions and lack of irrigation at the site, or contribution to riparian tree establishment work within the same watershed.

Annual Monitoring Report. An annual report should be prepared documenting the inventory of target-size large wood pieces identified and piece size reduction work performed in the Management Reach during each maintenance work session (pre-project, annual dry season, and as-need post-storm wet season).

One-Time Pre-Project Implementation Cost. The ballpark-estimated cost for implementing the piece size reduction work in the 1,500-foot-long Management Reach for the initial pre-project maintenance is about $25,000 (more if cut pieces are removed from the channel and placed back in the channel downstream from the basin site). This cost does not include permitting and compensatory mitigation planting costs, if applicable.

Ongoing Annual Average Implementation Cost. Annual recurring costs for monitoring and as-needed piece size reduction work, including reporting, are anticipated to average about $10,000.

5.0 Recommended Measure 2: Large Wood Retention Structure

The recommended piece size reduction program would reduce the supply of readily-mobilized down-dead and down-live large wood pieces on the creek bed. And, depending on how aggressive the piece size reduction work is implemented, it would reduce the number of live upright trees between 18- and 36-ft long that may enter the creek during storm flows by bank erosion or wind-throw. However, it would not entirely mitigate the potential supply of whole live standing trees which may be recruited by severe bank erosion during large and very large floods. Because there is expected to be as much as or more than 690 m^3 (900 cubic yards) of small and fine wood debris delivered to the FDS basin by the upper watershed during these very high peak flow events, the potential remains during rare events for a previously live standing tree to enter the stream by bank erosion and float into the basin, lodge as a “key” piece on the basin weir or spillway crest, and gather rafts of small and fine

debris to form a substantial jam. Therefore, it is recommended that the District nearly completely mitigate this potential by installing a large wood debris retention structure to catch large wood debris, such as a during-flood recruited whole tree, upstream from and before it floats onto and potentially lodges on the basin weir and diversion structure.

Large wood debris retention structures are typically comprised of a row of vertical posts spanning across the entire width of the channel with a maximum spacing between posts set and top elevation above the design flood water surface elevation for catching and holding large debris pieces and jams of smaller debris racked on large pieces during floods. Figure 10 shows some examples of wood debris retention structures used in Europe. Bradley et al. (2005) describe debris control structures used for bridges and culverts in the U.S.

Specifically, it is recommended that the District installs two columnar bollards spaced +/- 12-18 feet apart on the bed of Fairfax Creek along a cross-section within County property that is upstream from the basin weir, near the existing driveway bridge so that the District may remove caught debris using crane or large excavator equipment operated from the existing driveway bridge.

Design Considerations. A retention structure would significantly reduce the potential for a substantial rare-event jam from forming on the basin weir and the spillway crest, by forcing it – as a fail-safe measure – to form on the retention structure. If one or more large live trees are caught on the structure, there would likely be sufficient export of small and fine debris from the upper watershed to "rack" on the large pieces to form a jam nearly spanning the entire width of the creek. For example, the flow top width at the driveway bridge cross-section vicinity is 40-45 feet, and pieces up to about 36-feet-long are expected to be exported to the site during large and very large floods. In such a scenario, the altered hydraulics at the structure may cause excessive deposition of gravel on the channel bed, increased bank erosion pressure on the channel banks at either or both sides of the structure, or

incrementally higher flood water surface elevations upstream. These potential rare-event impacts are likely mitigable through design analysis and likely preferable to hydraulic and safety performance impacts of jam formation on the basin weir or spillway crest downstream. The hydraulic backwater effect resulting from basin operations extends upstream from the recommended retention structure location. Therefore, it follows generally, that a jam formed at the retention structure would not substantially increase upstream flood water surface elevations or coarse sediment deposition. As well, the channel-averaged velocities reduced by the backwater effect would buffer local impacts on bank erosion pressure caused by a jam concentrating surface flow on either side of the creek.

Should there be a debris blockage during a small or moderate flood flow when or before the basin is operated, there may be more pronounced impacts on upstream flood water surface elevations, but not to the extent to cause elevations higher than planned for under basin operations. Resulting local coarse sediment deposition and bank erosion pressure impacts may be more pronounced. Bank erosion protection planned for the larger FDS basin project would likely be sufficient, but may need to be augmented depending on the location of the retention facility, and the final details for the bank erosion protection in design development.

This study did not review Quincy Engineers' analysis of the structural capacity of the existing bridge which should be confirmed and selection of the structure location determined in conjunction with confirmation of appropriate equipment access and bridge capacity.

Landowner cooperation. The recommended location for the retention structure is within safe equipment reach from the existing private driveway bridge, entirely within County property. Landowner cooperation through outreach and sharing of design analysis may be needed to ensure property owners immediately upstream from the County property that the hydraulic impacts of a potential jam would not surcharge upstream water surface elevations any more than planned for as resulting from normal basin operations.

Avoid and Minimize Habitat Impacts. The permanent environmental impacts of installing two vertical columnar 12-inch-diameter steel pipe bollards on the Fairfax Creek bed are very small – approximately 1 lineal foot, 2 square feet, and 0.3 cubic yards of permanent fill would be placed below the ordinary high water line. The temporary construction impacts would be subsumed in those of the overall FDS basin facilities construction. Reliably dry channel bed conditions prevail at the site so there would not be temporary construction impacts to fisheries.

Mitigate Unavoidable Impacts. Unlikely required.

Annual Monitoring Report. Unlikely required.

One-Time Pre-Project Implementation Cost. The ballpark-estimated construction cost to install two 15-foot-high (exposed) 12-inch-diameter steel pipe bollards drilled and/or driven approximately 20 feet into the bed of Fairfax Creek (or less, depending on geotechnical analysis) is less than about $35,000. Combined with design and permitting, the one-time implementation cost of the retention structure may be as much as about $60,000.

Ongoing Annual Average Implementation Cost. Cost to remove debris caught on the retention structure is expected to be zero in most years, and less than $10,000 after rare events.

Residual Risk. Because the retention structure would be purposely located upstream from the basin weir facility and close to the existing driveway bridge, there would remain numerous existing live standing trees between the bridge and the spillway which may enter the basin during storm flows before or during basin operations. Moreover, in rare circumstances, large wood pieces could float through past the retention structure if oriented

in a s stream-lined direction. Therefore, the District should develop a contingency plan for safely removing large wood debris from the basin weir or spillway during basin operations. Such a plan would be even more critical if the District elects not to implement the recommended retention structure.

As well, small wood is expected to continue to pass freely into the site whether or not the District implements the recommended retention structure and/or the piece size reduction work. Accumulations of small debris are not expected to be large enough to significantly reduce basin performance, but yes, the District should also anticipate removing accumulated small wood debris from the basin weir and dam-spillway crest surfaces during basin operation events as needed to prevent unforeseen hydraulic performance impacts and, of course, also as needed for maintenance after high flow events.

6.0 Estimating Wood Debris Export from the Fairfax Creek Watershed

The recruitment, storage, and transport of wood debris are natural processes in river systems with riparian vegetation. Where creeks and rivers intersect infrastructure (diversions, culverts, bridges, reservoirs, etc.), the supply of small to large wood debris can impact their function (Moulin and Piegay 2004, Bradley et al. 2005). To better manage wood debris supplied to such facilities requires information on the rate of production, storage, and transport of wood debris from the upstream watershed (e.g. Senter et al. 2017). To help understand and better manage wood debris supplied to the Sunnyside FDS basin on Fairfax Creek, this study evaluates the potential wood exported from the upstream watershed and recommends wood debris management measures for minimizing potential effects on basin performance.

This study:

1. Estimates the wood export (volume per time) from the basin during large floods (e.g., multi-decade to 100-year flood) to inform evaluation of impacts to Sunnyside FDS basin performance. For example, during floods large pieces could lodge on the spillway or basin weir, subsequently collecting smaller wood pieces and forming a wood jam affecting the intended hydraulics of the structure.

2. Characterizes the wood volumes and piece lengths in the channel from the FDS basin upstream to the nearest culverts, as large pieces in this reach have a higher potential to impact the diversion structures. The upstream culverts can limit the passage of long wood pieces from the upper watershed.

3. Recommends additional methods to characterize wood export and monitoring of in-stream wood conditions, and potential wood management strategies (e.g., wood debris retention structures, wood piece size reduction and removal) to reduce potential failure of the diversion structure during large floods.

Wood Export. Preliminary results of this brief study indicate that as much as or more than about 300 cubic yards of floated wood debris may enter the FDS basin site during winter peak flows meeting or exceeding the 3-year peak flow, and probably as much as 3 or more times that amount in an extreme event.

To help manage wood debris supplied to the Sunnyside flood diversion and storage (FDS) basin on Fairfax Creek, this study evaluates wood export from the upstream watershed and wood debris management options. We constructed a wood budget to estimate wood exported from the basin during small and large floods. The wood budget "model" was developed specifically for this study using a combination of an attributed GIS stream layer, wood recruitment rates, wood storage, and wood transport estimates based on wood

mobility (see details later). The 3-year flood event (Q_3) in December 2012 exported an estimated 230 m^3 (300 yd^3) of wood debris forming a jam at a culvert inlet downstream of the FDS basin (Lockaby 2019, see details later). The wood budget model used to predict wood export was calibrated to match this export volume for a small flood. Predicted small and large flood wood export volumes at the Sunnyside FDS basin are 182 and 352 m^3 (238 - 460 yd^3), respectively, or roughly 23 to 46 dump truck loads of wood.

6.1 Background

6.1.1 Fairfax Creek Watershed

At the Sunnyside FDS basin, Fairfax Creek watershed drains an area of 4.1 km^2 (1.58 mi^2) from roughly 18.2 km (11.3 mi) of channels with ephemeral stream flow (Figure 1). Mean annual precipitation in the basin is 112 cm yr^{-1} (44 in yr^{-1}) (PRISM 2019). Riparian stands are comprised of hardwoods, predominately California bay laurel (*Umbellularia californica*) and willow (*Salix lasiandra*). The basin valley floor is comprised of Quaternary alluvial and colluvial fill and the underlying basin geology consists of Cretaceous Franciscan Mélange (Graymer et al. 2006), heavily prone to mass wasting in steep and convergent terrain (Wentworth et al. 1997, Ellen et al. 1997). Fairfax Creek channels are generally incised, down to bedrock in some areas, and are now widening in areas without revetted banks. Aggradation associated with the active channel widening is forming a new flood plain inset within the historically incised channel. This incised channel evolution follows the typical response to base level change or disturbance (e.g. Schumm et al. 1984, Schumm 1999) observed in many San Francisco Bay Area channels (e.g. Bigelow et al. 2016).

6.1.2 Sunnyside FDS Basin

The Sunnyside FDS basin is designed to reduce peak flows in flood prone areas downstream. A flow diversion and overflow structure constructed across Fairfax Creek controls how and when water is diverted into the basin. The diversion structure consists of a concrete spillway overlying a 5.5 m-wide by 1.8 m-high (18 ft-wide by 6 ft-high) culvert with a radial gate. During incipient flooding, the gate lowers to a partially closed position (0.4 m-high opening [1.3 ft]) to allow bypass flow. Flood water behind the diversion structure rises until it reaches the top of the basin weir, and then flows into the FDS basin. When flood water further rises to the top of the diversion spillway, flood water flows over the spillway and continues downstream. Backwater from the FDS operation can extend up to 320 m (350 yd) upstream.

6.1.3 Wood Export

Understanding how wood moves in a channel network is a key component in estimating wood export from a watershed. Numerous factors govern wood transport. Transport of large logs tend to occur when the pieces are shorter than bankfull width (Lienkaemper and Swanson 1987; Nakamura and Swanson 1993). For small branch size pieces, channel width may be less relevant to wood transport efficiency. Wood transport is affected by stream power and flow magnitude, so large floods transport more wood debris (Haga et al. 2002), where the largest wood export occurs during infrequent high flows (Fremier et al. 2010). Some wood can be mobilized at less than bankfull flows, threshold transport then increases linearly with discharge, and wood transport capacity is likely maximized at bankfull flows when overbank flow is reached (Kramer and Wohl 2017). Wood diameter can be a good predictor of mobilization (Haga et al. 2002). Iroume et al. (2015) found that pieces transported during average floods had diameters less than half bankfull depth (also see Braudrick and Grant 2000, Welber et al. 2013). Others have found that as the ratio of piece diameter to flow depth approach one, mobility is enhanced (Haga et al. 2002). Once wood is mobilized, there is generally no consistent relationship between piece size and travel distance. Reliable

prediction of wood export remains an open question, as knowledge of entrainment and transport processes is still limited by a lack of accurate field data (Mazzorana et al. 2017), in part due to the inherent difficulty of such measurements during floods.

6.2 Methods, Modeling, and Field Observations

6.2.1 Modeling Wood Recruitment and Export

To estimate stream wood exported from Fairfax Creek basin, we use a wood budget framework (e.g. Benda and Sias 2002, Benda et al. 2018). A wood budget is similar to a sediment budget, simplified here for this brief watershed scale study:

$$W_o = W_r \pm \Delta W_s \qquad \text{(Equation 1)}$$

where over a given time frame, W_o is the the wood volume exported from the basin; W_r is wood volume recruited into the channel network from the riparian stand by mortality, bank erosion, or mass wasting (m^3/time); and ΔW_s is the change in wood volume stored in the channel. In this approach, we do not account for loss of wood from decay. The wood budget constructed for this study (see more details later) provides more robust estimates of wood export with a fuller understanding and accounting of processes influencing wood recruitment, storage, and transport compared to rapid evaluations of wood export that simply measure wood storage in representative reaches and extrapolate those values to the entire watershed (e.g., Bradley et al. 2005, Diehl and Bryan 1993).

Both living and dead wood are stored in the Fairfax Creek channels (e.g. Opperman and Merenlender 2007). Living wood is recruited to the channel by bank erosion or landslides, but the roots remain attached to the channel banks. Dead wood is not rooted and consequently much more mobile. Live wood can be eroded and mobilized in large floods. With these

differences in mind, we estimated wood export from the basin for small and large floods as summarized on Figure 3 and described below.

Export during small floods on the scale of Q_3. Exported wood includes all dead wood (both in jams and between jams) for mobile pieces, plus the annual recruitment rate. The annual recruitment rate reflects both the rate at which wood is recruited to the stream and the rate all live wood in the stream breaks down to more mobile dead wood. This approach is reasonable if dead wood behind jams moves during bankfull flows. A recent wood transport review and synthesis by Kramer and Whol (2017) suggests that wood in jams moves during high flows, and jams reform on the receding limb, often in the same place (e.g. Curran 2010).

In this conception of wood export for small floods, all mobile dead wood gets out, the live wood stays. To maintain the mass balance of wood storage (Equation 1), wood export for annual flows (Q_1) should be similar to annual wood recruitment, while wood export for small floods (Q_3) should be a bit higher than annual wood recruitment (i.e. small net loss from wood storage).

Export during large floods (multi-decade to 100-year flood, Q_{large}). Exported wood includes all mobile dead and live pieces, the annual recruitment rate, a bank erosion recruitment rate, and a proportion of inset flood plain or hillslope overbank wood. Large floods are on the scale of multiple decades up to Q_{100}. This is reasonable based on our surveys of wood recruitment in Fairfax Creek. The oldest recruited trees date roughly back to the 2005 flood (Q_{100}), indicating that all the previous recruited live wood was scoured by bank erosion and transported in this event, and substantial amounts of new live wood were recruited to the channel by bank erosion. In this conception of wood export for large floods, all mobile live and dead wood gets out, and there's a substantial net loss of wood storage from the channel (Equation 1).

6.2.2 Field Measurements, Observations, Parameter Calculation

Wood Export Observation. We obtained one observation of wood export (W_o) from the Fairfax basin, where an estimated 230 m^3 of wood collected behind a plugged culvert (2.4 m diameter) under Sir Francis Drake Blvd at Glen Drive (Figure 2) in December 2012. Peak flow at the Ross gage on Corte Madera Creek was 78.4 m^3/s (2,770 ft^3/s) on December 2, 2012, a 3 or 4-year flood event (Q_3) as interpolated from the flood frequency curve for Ross gage (Stetson Engineers and geomorphDESIGN 2009). Blockages at bridges and culverts typically occur when whole trees or large pieces obstruct the inlet, then all subsequent pieces pile up (Lockaby 2019). The culvert is approximately 640 m downstream from the Sunnyside FDS basin and drains an area of 4.8 km^2 (1.85 mi^2) (Figure 1). We use this observed export volume to check and adjust (calibrate) our estimates of wood export based on surveyed wood recruitment and wood storage using Equation 1. The difference (%) between the predicted and observed export volume for small floods at the Glen Drive culvert is considered a residual for processes unaccounted for in the wood budget or errors from extrapolating limited data, similar to sediment budgets (e.g. Kondolf and Matthews 1991). This residual is added to the predicted export volumes to the FDS basin for both small and large floods.

Table 1.
Physical characteristics of the study reaches.

Reach No.	Length (m)	Bankfull width (m)	Channel area (ha)	Drainage area (km^2)	Channel slope (%)
1 Fairfax	295	6.7	0.20	4.1	0.7
2 Baywood	525	6.5	0.34	1.75	1.0
3 U. Fairfax	279	6.5	0.18	1.98	1.8

Conversion factors: 1 m = 3.28 ft, 1 ha = 2.47 acres , 1 km^2 = 0.386 mi^2

Wood Recruitment and Storage in Study Reaches. To parameterize wood recruitment rates and storage, we surveyed 1.1 km of channel from the FDS basin to areas upstream of several culverts on Baywood Canyon Creek and Upper Fairfax Creek (Figure 2). Table 1 summarizes the physical characteristics of the study reaches. To use our field time efficiently, it was necessary to define a minimum wood piece size for measurement. We surveyed all pieces of wood within the bankfull channel that were ≥ 10 cm (3.9 in) in diameter (as measured in the middle of the log) and 1.5 m (4.9 ft) in length, a size used to define large wood debris throughout the literature since the late 1970s (Ruiz-Villanueva 2016). Wood volumes are calculated as a cylinder. To account for wood volumes less than this size (i.e. branches and twigs) in the wood budget, we multiply the large wood volumes by 1.26 based on the volume ratio of branches less than 10 cm (3.9 in) diameter to trunk (stem or bole) for hardwoods (MacFarlane 2010, Ver Planck and MacFarlane 2014). We also measured bankfull channel width approximately every 150 m (164 yd). Channel distance and bankfull width were measured with a range finder and tape, respectively.

Table 2.
Large wood characteristics of the study reaches: mean age, recruitment rates, storage, jams. Volumes are for solid wood; fine wood debris volume is not included.

Reach No.	Mean age (yrs) recruit LW[a]				LW recruitment rates $m^3 ha^{-1} yr^{-1}$				All LW				Jams	
	Erosion	Mortality	Landslide	All	Erosion	Mortality	Landslide	All	no. pieces	storage $m^3 ha^{-1}$	ave diam (m)	ave length (m)	no. jams	prop blocked[c]
1 Fairfax	14.5	--	--	14.5	1.6	--	--	1.6	17	28.4	0.24	3.9	1	0.3
2 Boxwood	11.0	9.5	11.2	10.6	1.9	0.6	0.3	2.7	44	39.5	0.23	5.7	9	0.47
3 U. Fairfax	18.0	--	4.4	12.6	0.5	--	0.5	1.0	19	22.6	0.19	3.7	3	0.65

Notes

a Large Wood (>10 cm diameter,1.5 m length)

b average proportion of bankfull channel width blocked by jams

Conversion factors: 1 m = 3.28 ft, 1 $m^3 ha^{-1}$ = 0.53 $yd^3 acre^{-1}$.

Recruitment rates (W_r) were calculated by estimating the age of recruited pieces: recruited live wood was dated by cutting vertical limbs that grew after the piece fell into the channel and counting annual growth rings; recruited dead wood was aged using decay classes for hardwoods and associated age. The recruitment rate is calculated as the total volume of

recruited wood divided by the mean age of all recruited wood (Benda et al. 2002, Benda and Sias 2003, Benda and Bigelow 2014). Wood storage volume (W_s) includes all recruited wood and all other wood in the channel.

We measured 114 pieces of wood over 1.1 km (0.68 mi) of channel in the Fairfax Creek watershed (Figure 2). Calculated storage volumes and recruitment rates (Table 2) are generally an order of magnitude lower than literature values for Northern California streams (Benda and Bigelow 2014). Bank erosion was the dominant wood recruitment process (Table 2). Live wood rooted to channel banks comprised 56% of the total wood storage, the remaining comprised of dead wood (44%). These surveyed wood storage volumes and recruitment rates were not sufficient to produce the observed 230 m^3 (300 yd^3) wood exported in the 2012 small flood (Q_3). The surveyed reaches are in a residential area, and there was evidence of substantial wood removal from channels (cut logs in the channel, cut wood piles on channel banks), presumably by residents trying to prevent flooding and bank erosion from wood jams. The channel network above the study reaches are primarily in open space parkland free of contemporary wood removal activities. In addition, the steeper upland reaches bound by hillslopes likely have higher recruitment of wood from streamside slides, which can be a substantial wood recruitment process in the Coast Ranges (Benda et al. 2002, Benda and Bigelow 2014). Consequently, we apply the wood storage values to the study reaches only and use a proxy storage value for the upland watershed (see below). For all channels in the watershed, we developed a recruitment rate (W_r) back-calculated from the observed 230 m^3 (300 yd^3) wood export volume for Fairfax Creek using equation 1, where the export volume is divided by the Fairfax Creek watershed channel area (4.19 ha [10.4 acres]) , and further divided by 3 since it was 3-year event. The back-calculated recruitment rate of 14 $m^3\ ha^{-1}$ (7.4 $yd^3\ acre^{-1}$) is within the range of values reported for Northern California streams (Benda and Bigelow 2014).

Proxy Wood Storage for Upland Watershed. As a proxy for less impacted wood storage (W_s) in the upland watershed, we use large wood storage values published for San Geronimo Creek (Lawrence et al. 2013), a watershed adjacent to Fairfax Creek with similar riparian hardwoods. To account for fine wood debris (i.e. branches and twigs), we multiply the San Geronimo large wood volumes by 1.26 based on the volume ratio of branches less than 10 cm diameter to trunk (stem or bole) for hardwoods (MacFarlane 2010, Ver Planck and MacFarlane 2014).

Large Flood Wood Recruitment from Bank Erosion. A large flood wood recruitment rate from bank erosion was calculated from data collected from the study reaches. We have no way of constraining where the threshold for substantial erosion and mobility of live trees from the channel begins, but it was crossed in the 2005 flood (Q_{100}). Consequently, we calculated the wood recruitment rate from bank erosion during large floods using all trees recruited from bank erosion that dated to near the 2005 flood (Q_{100}). Because wood is actively removed from the study reaches, this rate is underestimated.

Large Flood Plain Wood Recruitment. To estimate flood plain or hillslope wood captured in large floods, we first estimated the Q_{100} flood plain area based on the difference between bankfull (Q_{BF}) and Q_{100} flood widths derived from channel cross sections and modelled water surface elevations (data from Stetson Engineers 2018). On average, the Q_{100} widths were 2.2 times larger than Q_{BF} widths, so flood plain area was estimated as 1.2 times bankfull channel area. The average Q_{100} water depth above the flood plain averaged 0.72 m (2.4 feet), sufficient to enhance mobility for diameters of wood in the study reach (i.e. ratio of piece diameter to flow depth ≥ 1, Haga et al. 2002), and consequently floodp lain wood is likely recruited rather than deposited. In addition, Q_{100} flows are confined by the incised channel walls, promoting recruitment rather than deposition of flood plain wood. Since we did not measure flood plain wood in our surveys, the volume of flood plain wood in each channel

segment was estimated based on flood plain dead wood storage values for San Geronimo Creek (Lawrence et al. 2013).

6.2.3 Wood Export Predictions

Stream Network. To calculate wood export (W_o), we created a synthetic stream network for the basin derived from a 2m DEM. Algorithms for flow direction and channel delineation are described in Miller (2003), Clarke et al. (2008), and Miller et al. (2015). The D-infinity algorithm (Tarboton 1997) was used to calculate flow accumulation values and identify channel initiation points. The channel network was divided into a linked set of channel segments, where individual channel reach lengths averaged 112 m (122 yd) (range 78 - 157 m [85 - 172 yd]) . Contributing area and channel length were calculated from the DEM for each segment. Regional regressions for Marin and Sonoma Counties (Collins and Leventhal 2013) were used to estimate bankfull channel width for each channel segment based on drainage area and adjusted to meet our field observations of bankfull width. The channel area of each segment was calculated as the product of channel length and adjusted bankfull width. Wood recruitment and storage values were applied (extrapolated) to the entire channel network based on channel area.

Wood Mobility. Mobile pieces available for wood export were defined based on the ratio of piece length to bankfull channel width (P_L/C_W) or downstream culvert width (see Figure 2), whichever was smaller. The piece length to culvert width factor was used to predict accumulation volumes at culverts and accordingly reduce the volume exported downstream. Many studies in the Pacific Northwest suggest that pieces less than bankfull width are mobile (Bilby 1984, Lienkaemper and Swanson 1987), while others have defined mobile pieces up to twice bankfull width for hardwood forests with smaller diameter wood, similar to the Fairfax Creek watershed (Benda et al. 2018). Consequently, we used a P_L/C_W mobility factor of 2,

meaning that pieces with lengths twice bankfull width and shorter are mobile during flood flows.

To determine the proportion of mobile wood volume in each channel segment, we use a regression relationship between the surveyed wood volumes (cumulative distribution) and piece lengths for dead and live wood (including fine wood debris, see earlier) (Figure 4), multiplied by the mobility factor of 2. The cumulative distribution shows live wood pieces are generally longer than dead wood pieces, reflecting that living wood is more stable and remains in place much longer than dead wood (e.g. Opperman and Merenlender 2007), until eroded and killed in large floods, while dead wood breaks down from mechanical abrasion during transport downstream.

Studies that track wood movement find that, once mobilized, the distance a piece is transported downstream is extremely variable and dependent on myriad factors, including piece characteristics, channel characteristics, and the flood hydrograph (Kramer and Wohl 2017), all factors we cannot account for in this brief study. Consequently, we use a simplifying assumption that once mobilized, wood pieces travel to the outlet.

Loose Wood Factor. The predicted wood export volumes are multiplied by 1.3 to account for the 30% void space in loose wood piles (e.g. bulk storage, Steeb et al. 2016). This allows a comparison to the observed wood export volume at the Glen Drive culvert, and an estimate of the bulk volumes that may have to be removed from the FDS basin.

6.3 Results and Discussion

6.3.1 General Observations

To determine which wood piece sizes (diameters and lengths) could lodge on the basin weir or diversion structure crest and spillway requires hydraulic evaluation or modeling (e.g.

Gschnitzer et al. 2017, Schalko et al. 2019). Wood pieces with large diameters and long lengths have a higher potential to lodge at structures than small pieces. Once a large "key" piece or pieces lodge, smaller pieces can accumulate behind it, forming a jam. Since all piece sizes are of potential concern, we characterize the size of all large wood in the survey reaches (see later). Wood pieces lodging on the gated culvert may be less likely since the partial opening is under water during flood operation. Similarly, impact damage to the basin weir or diversion structure from large logs may have a low probability, as the backwater from the diversion slows the velocity of floating logs. Backwater from the FDS operation during Q_{100} flows extends roughly 320 m (350 yd) upstream, with water depths on the order of 3.2 m (10.5 feet) near the diversion structure. We did not evaluate these backwater effects on wood transport, but presumably mobility and transport are enhanced, similar to a stream wood entering a reservoir, creating mobile rafts of wood.

The 230 m^3 (300 yd^3) wood exported by a Q_3 flood is the most useful empirical observation from the Fairfax Creek watershed. This wood volume from a small flood could potentially lodge on the FDS basin basin weir or spillway crests. Large floods should produce higher quantities of wood and can include whole living trees eroded from the channel or recruited from the riparian stand by bank erosion. As mentioned earlier, we do not have the observations to constrain the threshold where bank erosion of live in channel wood and from riparian stands begin, but there is presumably a linear or power relationship between bank erosion versus both flood size and drainage area (e.g. Benda et al. 2018). So, a few live trees erode and move in small floods and many trees in large floods. The oldest recruited trees in Fairfax Creek date roughly back to the 2005 flood (Q_{100}), indicating that all the previous recruited live wood was scoured by bank erosion and transported in this event, and substantial amounts of new live wood were recruited to the channel by bank erosion.

6.3.2 Large Wood Characteristics

A longitudinal profile of wood storage along the study reaches (Figure 5) shows large spatial variation, where high wood storage is concentrated at recent recruitment from localized bank erosion often creating wood jams, followed by long stretches devoid of wood, in part affected by removal of wood by residents. The frequency distribution of measured large wood piece diameters and piece lengths (Figure 6) shows a right skewed distribution, where there are many small pieces and fewer large pieces, reflecting both da Vinci's rule for tree branching ("all the branches of a tree at every stage of its height when put together are equal in thickness to the trunk") and the gradual breakdown of whole trees recruited to the channel. This distribution is often reflected in wood jams, where larger "key" pieces create jams by blocking the channel and accumulating smaller pieces (Figure 7).

This scenario of jam formation in channels is similar to potential jam formation at the FDS diversion structures, where one of the *few* large wood pieces may lodge on the diversion infrastructure with *many* small pieces accumulating behind it, forming a jam.

6.3.3 Wood Export

Table 3 summarizes the parameters used to predict wood export and the resulting volume predictions for small and large floods, predicted small and large flood export volumes at the Sunnyside FDS basin are 182 and 352 m^3 (238 and 460 yd^3) respectively, or roughly 23 to 46 dump truck loads of wood. These estimated wood export volumes are within the range of wood exported by floods from basins of similar size compiled in two recent review papers covering wood export (Comiti et al. 2016, Ruiz-Villanueva et al. 2017, Figure 8).

Table 3.
Parameters used to estimate wood export and predicted wood export volumes.

Small Flood Parameter/Prediction	**Applied to**	**Values**	**Units**
Fairfax dead wood storage (measured)	study reaches	28	$m^3\ ha^{-1}$
San Geronimo dead wood storage (proxy)	upper reaches	63	$m^3\ ha^{-1}$
Fairfax recruit wood (back calculated)	all reaches	14	$m^3\ ha^{-1}$
mobility factor: piece length/channel width	all reaches	2	
porosity factor: solid wood to loose wood	predicted export volumes	1.3	
Export observed at Glen Dr culvert (DA 4.8 km^2)		230	m^3
Export predicted at Glen Dr culvert (DA 4.8 km^2)		186	m^3
Deposition predicted behind upstream culverts		39	m^3
Observed and predicted difference (residual)		20	%
Export predicted at FDS Basin (DA 4.1 km^2)		**182**	**m^3**
Deposition predicted behind upstream culverts		31	m^3
Large Flood Parameter/Prediction			
Fairfax dead wood storage (measured)	study reaches	28	$m^3\ ha^{-1}$
Fairfax live wood storage (measured)	study reaches	36	$m^3\ ha^{-1}$
San Geronimo dead wood storage (proxy)	upper reaches	63	$m^3\ ha^{-1}$
San Geronimo live wood storage (proxy)	upper reaches	50	$m^3\ ha^{-1}$
San Geronimo flood plain wood storage (proxy)	all reaches	13	$m^3\ ha^{-1}$
Fairfax recruit wood (back calculated)	all reaches	14	$m^3\ ha^{-1}$
Fairfax large flood bank erosion recruit wood	all reaches	23	$m^3\ ha^{-1}$
mobility factor: piece length/channel width	all reaches	2	
porosity factor: solid wood to loose wood	predicted export volumes	1.3	
Export predicted at FDS Basin (DA 4.1 km^2)		**352**	**m^3**
Deposition predicted behind upstream culverts		65	m^3

Conversion factors: 1 m^3 = 1.31 yd^3, 1 $m^3\ ha^{-1}$ = 0.53 $yd^3\ acre^{-1}$

Figure 9 shows the predicted percentage of all mobile wood predicted for a large flood from the Fairfax Creek watershed, where the majority of mobile wood is supplied from the larger 3rd and 4th order channels. Any debris removal or reduction efforts (described later) should be focused on these reaches.

6.3.4 Primary Implications of the Wood Budget for the FDS Basin

In summary, the wood budget constructed for the Fairfax Creek watershed provides several critical pieces of data to more effectively plan for and manage wood transported to the FDS basin in small and large floods:

1) **Wood supply processes and implications**: Live wood rooted to channel banks comprises 56% of the wood stored in the channel of Fairfax Creek, and most of the wood enters the channel from bank erosion (Table 2), in part because the channel has incised and is currently in the widening phase of "incised channel evolution" (see Schumm et al. 1984, Schumm 1999). Most wood recruited to the channel by bank erosion remains alive because it is still rooted to the bank (e.g., Opperman and Merenlender 2007). The oldest recruited trees in the channel date back to the 2005 flood (Q_{100}), indicating that all previous live and dead in-channel wood was eroded from the channel banks and bed in this remarkable event. Because wood recruited in large floods include both whole living trees eroded from the channel and the riparian trees on the adjacent flood plain and terrace (former flood plain prior to incision), these pieces with rootwads are likely to impact and hang on the FDS structures, allowing smaller pieces to accumulate behind them, creating a jam that could cause failure of the FDS basin. The dominance of wood recruitment by bank erosion in Fairfax Creek and the evidence of massive bank erosion and scouring of channel wood during the 2005 flood indicate that countermeasures are necessary to prevent failure of the FDS structures.

2) **Wood export volumes**: The wood export estimates for small (on the scale of Q_3) and large (multi-decade to Q_{100}) floods provide an order of magnitude estimate of wood volumes the District should initially plan for at the FDS basin. For example, should the District initially plan to annually manage 10, 100, 1,000, or 10,000 m^3 of wood exported to the FDS basin? Also, how much wood could be exported from episodic large floods and could it cause failure of the FDS structures? Based on the wood budget calibrated to one empirical wood export observation, estimated wood exported for small and large floods are on the order of 182 and 352 m^3 (238 and 460 yd^3), respectively, or more broadly in order of magnitude estimates, 100 - 900 m^3 (130 - 1,200 yd^3). These estimated wood export volumes are within the range of wood exported by floods from basins of similar size compiled in two recent review papers on wood export (Comiti et al. 2016, Ruiz-Villanueva et al. 2017, Figure 8). These estimated wood volumes also indicate that countermeasures are necessary to prevent failure of the FDS structures. After construction of the FDS basin, the District can use empirical observations of wood volumes to adjust their future maintenance costs more accurately.

3) **Dominant Wood Source Area to FDS Basin**: The wood budget identifies the primary source areas of wood exported to the FDS Basin based on wood storage volumes, wood piece lengths, and wood transport (wood mobility: wood piece length/channel width ratio). Figure 9 shows the predicted percentage of all mobile wood predicted for a large flood from the Fairfax Creek watershed, where the majority of mobile wood is supplied from the larger 3rd and 4th order channels (shown in red and orange). Any debris removal or reduction efforts allowed by regulatory agencies should be focused on these reaches.

6.4 Options for Additional Study

The estimates of wood export from small and large floods from Fairfax Creek are an approximation but likely correspond to the correct order of magnitude in the context of a wood budgeting techniques, similar to estimates from sediment budgets (e.g. Reid and Dunne 1996). If better estimates of wood export are desired by the District, additional field work and more detailed modeling options are outlined below. However, the observed 230 m^3 exported wood volume from a Q_3 flood event alone suggests that efforts to mitigate wood debris impacts to FDS basin infrastructure are warranted. Efforts to improve wood export estimates could include stream surveys in the upland reaches to provide reliable estimates of wood storage and recruitment rates. Steeper channels bound by hillslopes likely have a high contribution of wood from streamside slides and are free of wood removal impacts. The surveys could include some subsampling of fine wood debris and overbank/flood plain wood. Better estimates of wood transport and export can be developed by tagging and tracking wood pieces (e.g. Ravazzolo et al. 2015) and video monitoring (e.g. Senter et al. 2017), respectively. More detailed estimates of wood mobility and export based on flow depth/wood diameter and flood width/piece length are possible with approaches that include simple to complex flow modeling (e.g. Mazzorana et al. 2011, Benda et al. 2018). Perhaps the cheapest, simplest, and most useful effort to improve estimates of wood export could involve the District soliciting observations of wood accumulations behind bridges and culverts from known flood events throughout Marin County (e.g. from Public Works agencies). If sufficient observations were available, wood export volumes versus discharge and drainage area curves (e.g., Figure 8) could be developed for Marin County watersheds and applied to management of the Sunnyside FDS basin on Fairfax Creek and any similar projects.

A wood debris retention structure may be incorporated in the FDS basin facility for mitigating the residual risk of standing live trees in the management reach that are outside the scope of the recommend piece size reduction monitoring and maintenance program from being

entrained into Fairfax Creek by rare-event bank erosion and floated into the basin where they would potentially be "key" pieces for a jam formation on the basin weir or spillway crest. The absolute number of live standing trees that may enter Fairfax Creek and Baywood Canyon Creek by rare-event bank erosion within the 1,500-foot-long management reach may not be large enough to justify the capital and recurring operations and maintenance costs of a retention structure. Rather, the plan recommends evaluating rare-event bank erosion susceptibility within the management reach in more detail and first considering the potential for targeted bank erosion protection measures, and adding bank erosion monitoring to the annual and post-flood monitoring and maintenance program measures to substantially reduce the residual risk of during-flood live tree recruitment.

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Appendix A

Large dead wood lengths, diameters, and volumes within the bankfull channel from the FDS basin upstream to first culvert on Baywood Canyon Creek (Figure 2). Note that some bay laurel pieces at the same distance (e.g. three x 0.3 diameter pieces at 250 m) are actually one piece joined at the rootwad, but the stem volumes were calculated as individual pieces, see photo below.



Dead bay laurel 250 m (273 yd) upstream from FDS basin.

Appendix A - Dead Wood

Reach	Distance moving US		Diameter		Length		Volume		Jam
	(m)	(yd)	(m)	(ft)	(m)	(ft)	(m^3)	(yd^3)	
1 Fairfax	21	23	0.2	0.7	3	9.8	0.09	0.12	
1 Fairfax	90	98	0.2	0.7	1.5	4.9	0.05	0.06	
1 Fairfax	105	115	0.1	0.3	4	13	0.03	0.04	
1 Fairfax	145	159	0.15	0.5	4	13	0.07	0.09	
1 Fairfax	165	180	0.2	0.7	6	20	0.19	0.25	
1 Fairfax	165	180	0.15	0.5	4	13	0.07	0.09	
1 Fairfax	200	219	0.2	0.7	1.5	4.9	0.05	0.06	
1 Fairfax	217	237	0.4	1.3	1.5	4.9	0.19	0.25	
1 Fairfax	250	273	0.3	1.0	6	20	0.42	0.55	Y
1 Fairfax	250	273	0.3	1.0	6	20	0.42	0.55	Y
1 Fairfax	250	273	0.3	1.0	6	20	0.42	0.55	Y
1 Fairfax	250	273	0.2	0.7	3	9.8	0.09	0.12	Y
1 Fairfax	250	273	0.25	0.8	2	6.6	0.10	0.13	Y
1 Fairfax	266	291	0.1	0.3	2	6.6	0.02	0.02	
1 Fairfax	268	293	0.3	1.0	1.5	4.9	0.11	0.14	
1 Fairfax	295	323	0.4	1.3	2.5	8.2	0.31	0.41	
2 Baywood	320	350	0.2	0.7	1.5	4.9	0.05	0.06	Y
2 Baywood	320	350	0.5	1.6	1.5	4.9	0.29	0.39	Y
2 Baywood	350	383	0.2	0.7	10	33	0.31	0.41	Y
2 Baywood	350	383	0.1	0.3	3	9.8	0.02	0.03	Y
2 Baywood	350	383	0.1	0.3	3	9.8	0.02	0.03	Y
2 Baywood	350	383	0.1	0.3	3	9.8	0.02	0.03	Y
2 Baywood	350	383	0.1	0.3	3	9.8	0.02	0.03	Y
2 Baywood	350	383	0.1	0.3	3	9.8	0.02	0.03	Y
2 Baywood	350	383	0.1	0.3	3	9.8	0.02	0.03	Y
2 Baywood	415	454	0.2	0.7	4	13	0.13	0.16	
2 Baywood	415	454	0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	415	454	0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	415	454	0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	415	454	0.1	0.3	3	9.8	0.02	0.03	
Culvert 3.6 m (12 ft) wide at 471 m (515 yd)									

Appendix B

Piece lengths, diameters, and volumes of all large wood (dead and live) within the bankfull channel in all study reaches.

Note that some bay laurel pieces at the same distance are actually one piece joined at the rootwad, but the stem volumes were calculated as individual pieces, see example from reach #2 on Baywood Canyon Creek below.



Multiple-stem down-dead trees in Baywood Canyon Creek segment of management reach.

Appendix B - All Live and Dead Wood

	Distance (moving US)			Live	Age	Diameter		Length		Volume		
Reach	(m)	(yd)	Species	Dead	(yr)	(m)	(ft)	(m)	(ft)	(m^3)	(yd^3)	Jam
1 Fairfax	3	3	willow	live	5	0.2	0.7	3	9.8	0.09	0.12	
1 Fairfax	21	23		dead		0.2	0.7	3	9.8	0.09	0.12	Y
1 Fairfax	90	98		dead		0.2	0.7	1.5	4.9	0.05	0.06	
1 Fairfax	105	115		dead		0.1	0.3	4	13	0.03	0.04	Y
1 Fairfax	145	159		dead		0.15	0.5	4	13	0.07	0.09	Y
1 Fairfax	165	180		dead		0.2	0.7	6	20	0.19	0.25	Y
1 Fairfax	165	180		dead		0.15	0.5	4	13	0.07	0.09	Y
1 Fairfax	200	219		dead		0.2	0.7	1.5	4.9	0.05	0.06	
1 Fairfax	200	219	willow	live	17.5	0.3	1.0	6	20	0.42	0.55	
1 Fairfax	217	237		dead		0.4	1.3	1.5	4.9	0.19	0.25	
1 Fairfax	250	273		dead		0.2	0.7	3	9.8	0.09	0.12	Y
1 Fairfax	250	273		dead		0.25	0.8	2	6.6	0.10	0.13	Y
1 Fairfax	250	273		dead		0.3	1.0	14	46	0.99	1.29	Y
1 Fairfax	250	273		dead		0.3	1.0	14	46	0.99	1.29	Y
1 Fairfax	250	273		dead		0.3	1.0	14	46	0.99	1.29	Y
1 Fairfax	266	291		dead		0.1	0.3	2	6.6	0.02	0.02	
1 Fairfax	268	293		dead		0.3	1.0	1.5	4.9	0.11	0.14	
1 Fairfax	295	323		dead		0.4	1.3	2.5	8.2	0.31	0.41	
1 Fairfax	295	323	bay	live	14	0.4	1.3	6	20	0.75	0.99	
2 Baywood	305	334	bay	live	5	0.25	0.8	11	36	0.54	0.71	
2 Baywood	320	350		dead		0.2	0.7	1.5	4.9	0.05	0.06	Y
2 Baywood	320	350		dead		0.5	1.6	1.5	4.9	0.29	0.39	Y
2 Baywood	320	350	bay	live	20	0.3	1.0	12	39	0.85	1.11	
2 Baywood	350	383		dead		0.2	0.7	10	33	0.31	0.41	Y
2 Baywood	350	383		dead		0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	350	383		dead		0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	350	383		dead		0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	350	383		dead		0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	350	383		dead		0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	350	383		dead		0.1	0.3	3	9.8	0.02	0.03	
2 Baywood	375	410	bay	live	2	0.25	0.8	12	39	0.59	0.77	
2 Baywood	415	454		dead		0.2	0.7	4	13	0.13	0.16	
2 Baywood	415	454		dead		0.1	0.3	3	10	0.02	0.03	Y

Reach	Distance (moving US) (m)	(yd)	Species	Live Dead	Age (yr)	Diameter (m)	(ft)	Length (m)	(ft)	Volume (m^3)	(yd^3)	Jam
2 Baywood	415	454		dead		0.1	0.3	3	10	0.02	0.03	Y
2 Baywood	415	454		dead		0.1	0.3	3	10	0.02	0.03	Y
2 Baywood	415	454		dead		0.1	0.3	3	10	0.02	0.03	Y
2 Baywood	425	465	bay	live	3.5	0.2	0.7	12	39	0.38	0.49	Y
2 Baywood	425	465	bay	live	3.5	0.2	0.7	12	39	0.38	0.49	Y
2 Baywood	471	515	**Culvert 3.6 m (12 ft) wide**									
2 Baywood	512	560	bay	live	17.5	0.5	1.6	2	6.6	0.39	0.51	
2 Baywood	520	569		dead		0.4	1.3	2.5	8.2	0.31	0.41	Y
2 Baywood	520	569		dead		0.2	0.7	3	9.8	0.09	0.12	Y
2 Baywood	520	569		dead		0.2	0.7	1.5	4.9	0.05	0.06	Y
2 Baywood	535	585	bay	live	17.5	0.4	1.3	1.5	4.9	0.19	0.25	
2 Baywood	535	585		dead		0.2	0.7	1.5	4.9	0.05	0.06	
2 Baywood	535	585		dead		0.2	0.7	1.5	4.9	0.05	0.06	
2 Baywood	538	588		dead		0.1	0.3	1.5	4.9	0.01	0.02	Y
2 Baywood	538	588	bay	live	17.5	0.4	1.3	2	6.6	0.25	0.33	
2 Baywood	558	610		dead		0.1	0.3	4	13	0.03	0.04	
2 Baywood	580	634		dead		0.15	0.5	5	16	0.09	0.12	Y
2 Baywood	580	634		dead		0.2	0.7	3	9.8	0.09	0.12	Y
2 Baywood	580	634	eldberry	live	4.5	0.2	0.7	8	26	0.25	0.33	
2 Baywood	590	645	willow	live	14	0.2	0.7	12	39	0.38	0.49	
2 Baywood	600	656		dead		0.3	1.0	8	26	0.57	0.74	Y
2 Baywood	600	656	willow	live	22.5	0.35	1.1	12	39	1.15	1.51	
2 Baywood	620	678		dead		0.25	0.8	7	23	0.34	0.45	
2 Baywood	650	711		dead		0.15	0.5	4.5	15	0.08	0.10	
2 Baywood	675	738		dead		0.1	0.3	2	6.6	0.02	0.02	
2 Baywood	675	738		dead		0.25	0.8	2	6.6	0.10	0.13	
2 Baywood	685	749		dead		0.2	0.7	2.5	8.2	0.08	0.10	
2 Baywood	695	760		dead		0.1	0.3	2	6.6	0.02	0.02	Y
2 Baywood	695	760		dead		0.1	0.3	2	6.6	0.02	0.02	Y
2 Baywood	715	782		dead		0.2	0.7	2	6.6	0.06	0.08	
2 Baywood	735	804		dead		0.4	1.3	8	26	1.01	1.31	Y
2 Baywood	740	809		dead		0.4	1.3	8	26	1.01	1.31	Y
2 Baywood	740	809		dead		0.5	1.6	5	16	0.98	1.28	
2 Baywood	760	831	willow	live	4.5	0.2	0.7	6	20	0.19	0.25	Y
2 Baywood	764	836		dead		0.15	0.5	6	20	0.11	0.14	

Reach	Distance (moving US) (m)	(yd)	Species	Live Dead	Age (yr)	Diameter (m)	(ft)	Length (m)	(ft)	Volume (m^3)	(yd^3)	Jam
2 Baywood	774	846		dead		0.1	0.3	1.5	4.9	0.01	0.02	Y
2 Baywood	774	846	willow	live	10	0.2	0.7	7	23	0.22	0.29	
2 Baywood	785	858	willow	live	10	0.15	0.5	7	23	0.12	0.16	Y
2 Baywood	785	858	willow	live	10	0.15	0.5	7	23	0.12	0.16	Y
2 Baywood	785	858	willow	live	10	0.15	0.5	7	23	0.12	0.16	Y
2 Baywood	785	858	willow	live	10	0.15	0.5	7	23	0.12	0.16	Y
2 Baywood	790	864	willow	live	20	0.15	0.5	7	23	0.12	0.16	Y
2 Baywood	790	864	willow	live	20	0.15	0.5	7	23	0.12	0.16	Y
2 Baywood	790	864	willow	live	20	0.15	0.5	7	23	0.12	0.16	Y
2 Baywood	800	875		dead		0.2	0.7	3	9.8	0.09	0.12	Y
2 Baywood	800	875	willow	live	5.5	0.15	0.5	8	26	0.14	0.18	
2 Baywood	800	875	willow	live	5.5	0.2	0.7	8	26	0.25	0.33	Y
2 Baywood	820	897	**End reach at tributary with 4.6 m (15 ft) wide culvert**									
3 U Fairfax	0	0	**Start reach at 1.8 m (6 ft) wide culvert**									
3 U Fairfax	15	16		dead		0.25	0.8	2	6.6	0.10	0.13	
3 U Fairfax	61	67		dead		0.2	0.7	3.5	11	0.11	0.14	
3 U Fairfax	61	67		dead		0.15	0.5	2	6.6	0.04	0.05	
3 U Fairfax	61	67	**Culvert 2.0 m (6.5 ft) wide**									
3 U Fairfax	122	133		dead		0.15	0.5	4	13	0.07	0.09	Y
3 U Fairfax	122	133		dead		0.15	0.5	4	13	0.07	0.09	Y
3 U Fairfax	122	133		dead		0.15	0.5	4	13	0.07	0.09	Y
3 U Fairfax	126	138		dead		0.15	0.5	4	13	0.07	0.09	Y
3 U Fairfax	126	138		dead		0.15	0.5	4	13	0.07	0.09	Y
3 U Fairfax	180	197	willow	live	14	0.15	0.5	8	26	0.14	0.18	Y
3 U Fairfax	180	197	willow	live	14	0.15	0.5	8	26	0.14	0.18	Y
3 U Fairfax	180	197	willow	live	14	0.15	0.5	8	26	0.14	0.18	Y
3 U Fairfax	210	230		dead		0.15	0.5	3	9.8	0.05	0.07	
3 U Fairfax	240	262		dead		0.2	0.7	2	6.6	0.06	0.08	
3 U Fairfax	255	279		dead		0.2	0.7	7	23	0.22	0.29	Y
3 U Fairfax	255	279		dead		0.3	1.0	2	6.6	0.14	0.18	Y
3 U Fairfax	255	279		dead		0.2	0.7	8	26	0.25	0.33	Y
3 U Fairfax	255	279		dead		0.15	0.5	1.5	4.9	0.03	0.03	Y
3 U Fairfax	255	279		dead		0.15	0.5	1.5	4.9	0.03	0.03	Y
3 U Fairfax	255	279		dead		0.15	0.5	1.5	4.9	0.03	0.03	Y
3 U Fairfax	255	279		dead		0.2	0.7	2	6.6	0.06	0.08	

	Distance (moving US)			Live	Age	Diameter		Length		Volume		
Reach	**(m)**	**(yd)**	**Species**	**Dead**	**(yr)**	**(m)**	**(ft)**	**(m)**	**(ft)**	**(m^3)**	**(yd^3)**	**Jam**
3 U Fairfax	255	279		dead		0.2	0.7	2	6.6	0.06	0.08	
3 U Fairfax	255	279		dead		0.2	0.7	2	6.6	0.06	0.08	
3 U Fairfax	255	279		dead		0.2	0.7	2	6.6	0.06	0.08	
3 U Fairfax	255	279		dead		0.2	0.7	2	6.6	0.06	0.08	
3 U Fairfax	255	279		dead		0.2	0.7	2	6.6	0.06	0.08	
3 U Fairfax	270	295		dead		0.25	0.8	6	20	0.29	0.39	
3 U Fairfax	270	295		dead		0.15	0.5	1.5	4.9	0.03	0.03	Y
3 U Fairfax	270	295		dead		0.15	0.5	1.5	4.9	0.03	0.03	Y
3 U Fairfax	300	328		dead		0.15	0.5	2	6.6	0.04	0.05	
3 U Fairfax	325	355	willow	live	20	0.2	0.7	3	9.8	0.09	0.12	Y
3 U Fairfax	330	361	willow	live	20	0.25	0.8	6	20	0.29	0.39	Y
3 U Fairfax	330	361	willow	live	20	0.25	0.8	6	20	0.29	0.39	Y
3 U Fairfax	330	361	willow	live	20	0.25	0.8	6	20	0.29	0.39	Y
3 U Fairfax	330	361	willow	live	20	0.25	0.8	6	20	0.29	0.39	Y
3 U Fairfax	330	361		dead		0.25	0.8	2	6.6	0.10	0.13	Y