

# Annual Report for the Stream Maintenance Program in 2019 (Year 3)



Prepared by:  
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San Francisco Bay Regional Water Quality Control Board Permit Order No. R2-2017-0028  
California Department of Fish and Wildlife Streambed Alteration Agreement Notification  
No. 1600-2012-0207-R3 and No. 1600-2012-0202-R3

**JANUARY 2019**

## Project Background

The Marin County Flood Control and Water Conservation District (District) maintains 37 miles of stream channels, several basins, and numerous flood control facilities in Marin County. The District has developed a Stream Maintenance Program (SMP) to guide and permit maintenance activities implemented within the County flood control zones and associated municipal jurisdictions for the purpose of flood control.

The SMP includes five types of maintenance activities: (1) vegetation management, (2) sediment and debris removal, (3) erosion control, (4) facilities maintenance and repair of flood control structures, and (5) levee maintenance. These activities are carried out to maintain flow capacity of the creek channel. The SMP does not include large capital improvement projects, large sediment removal projects (e.g. Novato Creek sediment removal), or new bank stabilization projects using rock rip-rap. Work is performed between June 15 and October 15.

The geographic extent of the SMP includes eight program areas: seven flood control zones and one County Service Area (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 5 – Stinson Beach
- Flood Control Zone 6 – San Rafael Meadows
- Flood Control Zone 7 – Santa Venetia
- Flood Control Zone 9 – Ross Valley
- County Service Area 13 – Upper Lucas Valley

All project areas are in eastern Marin County, except for Flood Control Zone 5, which is in Stinson Beach in West Marin. Each project area includes several sites, which are differentiated based on stream reaches and habitat types. Each site was classified as being tidally-influenced or not and was further classified as to habitat type as identified in a Biological Assessment completed for the program (*Biological Assessment for Routine Flood Control Maintenance Activities*, June 2012).

No aspect of the SMP is implemented in areas where the County or its municipal partners do not have direct legal jurisdiction or landowner permission. Maintenance work occurs on lands where the County and/or its municipal partners own the land outright in fee title or hold legal easements. In a limited number of sites, vegetation maintenance activities may occur on private parcels for which the District and/or its municipal partners annually receive written landowner right-to-enter permissions in order to perform maintenance activities.

## Data Collection

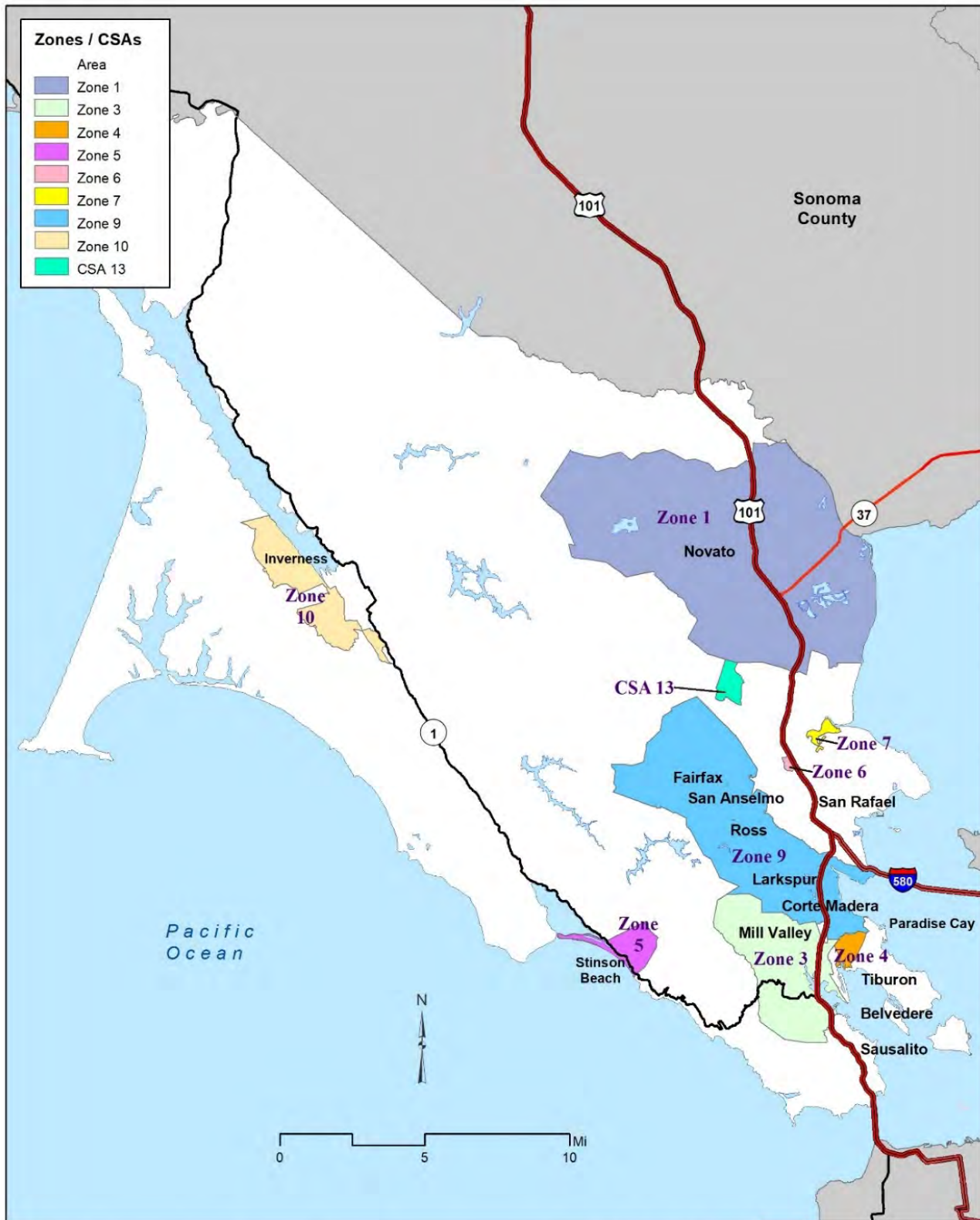
In 2019, a new data collection method was developed and piloted as a means of documenting that annual maintenance meets the Regional Water Quality Control Board requirements. Trimming or removal of native vegetation was categorized by size and type (or feature class). Size was divided into three different categories: small (<15 linear feet (LF)), medium (15-30 LF), and large (30-45 LF). Type was further divided into downed tree, dead tree (standing), downed branches, low branches, natural debris (clumps of smaller vegetative material), native species blocking flow in channel that require maintenance, and erosion. Invasive species that

were removed were reported in general as a size category based on square feet (ft<sup>2</sup>): small (<25 ft<sup>2</sup>), medium (25-100 ft<sup>2</sup>), and large (100-400 ft<sup>2</sup>).

### **SMP CEQA and Program Permits**

- California Environmental Quality Act (CEQA)- The East Marin project sites are included in the CEQA Initial Study/NegDec (IS/MND) dated June 6, 2012- State Clearing House #2012022053. The projects in Stinson Beach are covered under the Addendum IS/MND to Easkoot Creek Sediment Removal State Clearing House #2007-092065.
- SF Bay Regional Water Quality Control Board (RWQCB) Order No. R2-2017-0028: July 20, 2017. The District was issued a five year programmatic permit for the SMP program. 2019 is the third year of maintenance under this permit.
- California Department of Fish and Wildlife (CDFW): Routine Maintenance Agreement No. 1600-2012-0207 (East Marin) and 1600-2012-0202-R3 (Stinson Beach West Marin permit issued in 2012 was extended in 2017 until Dec. 31, 2020.
- United States Army Corps of Engineers (USACE): The USACE issues permits for the projects contained within the SMP on an “as-needed basis” depending whether the project falls within Corps jurisdiction. If Special Status Species are involved the Corps permit may include consultation from National Marine Fisheries Service or US Fish and Wildlife Service.

**Figure 1:** Map of Marin County Flood Control and Water Conservation District program areas.



**Marin County Flood Control District Zones and related County Service Area**

Marin County Flood Control and Water Conservation District  
January 2020



## 2019 Program Implementation

In 2019 the District's Stream Maintenance Program (SMP) activities included sediment/debris removal, and vegetation maintenance in creeks and around a pump station. A total of 29 sites had work completed in them, with sediment removal activities completed at eight sites, vegetation maintenance completed at 22 sites, one pump station was maintained (Lynwood). Total linear feet (LF) of impact for both vegetation and sediment maintenance was 4,256 LF.

Sediment removal occurred on concrete engineered channels (1,275 LF) and earthen engineered channels (935 LF). Total sediment removal in cubic yards (CY) was 735 CY. See *Appendix B* for a list of all project sites, linear footage of vegetation cut/removed, or sediment removed and cubic yards (CY) of sediment removed per site. All tide gates were checked, but none had to be cleaned or repaired this year. All pump stations were also checked, but only Lynwood (1-LYC) required work in water (for access). Work at Lynwood consisted of trimming cattails (*Typha* sp.) and then removing French broom (*Genista monsplenssula*) as part of the eco-uplift (i.e. mitigation). Vegetation maintenance mainly consisted of removing downed branches from the creek channel to not impede flow in vulnerable constrained locations. This removal reduced the chances of flooding to the neighboring residents. Removing low branches and trimming native species (e.g. cattails) blocking the flow of water were the next two categories that made up the majority of 2019 vegetation maintenance work.

At 16 sites, 446 LF of potential vegetation maintenance were identified. These areas consisted of downed trees, downed branches, or low branches that could potentially impede channel flow, but were deemed to not need immediate removal. No action was taken in 2019, but these areas will continue to be monitored (see *Appendix B*, Monitor column).

Due to the temporal impact of vegetation maintenance to allow channel flow during the winter, an eco-uplift (i.e. mitigation) is required. The 2019 eco-uplift consisted of removing invasive species and trash. Invasive species removed consisted of acacia (*Acacia* sp.), bamboo (*Phyllostachys* sp.), Harding grass (*Phalaris aquatica*), English ivy (*Hedera helix*), fennel (*Foeniculum vulgare*), French broom, Himalayan blackberry (*Rubus armeniacus*), Mexican fan palm (*Washingtonia robusta*), Pampas grass (*Cortaderia jubata*), and privets (*Ligustrum* sp.). Removed trash consisted in large part of homeless camps and abandoned mattresses. Where possible, the eco-uplift occurred in the same zone as the vegetation maintenance. A total of 17,347 ft<sup>2</sup> of eco-uplift was required in 2019 (1:1.1, acres disturbed to acres enhanced). We exceeded this requirement, with an eco-uplift of 62,912 ft<sup>2</sup>. As most of the vegetation maintenance occurred in Zone 1, most of the eco-uplift also occurred in Zone 1.

SMP work was conducted by several groups with varying expertise, including: County of Marin Department of Public Works Roads crews, Conservation Corps North Bay (CCNB), Students and Teachers Restoring a Watershed (STRAW), local municipalities (e.g. City of Mill Valley), and private contractors to manage and implement prescribed maintenance activities.

### CNDDDB Reporting

In 2019 no special status species were observed during the pre-project surveys or daily site walk-throughs; therefore, no sightings were reported to the California Natural Diversity Database (CNDDDB).

### Photo Monitoring

Photos monitoring was conducted at each of the eight-sediment maintenance site (see *Appendix C*). As some maintenance sites encompassed larger areas or various work areas, representative photos were chosen.

Photos were taken during initial creek walks to identify the condition of the creek channel and any vegetation needed to be removed/trimmed and non-native species to be removed. After work within the 29 sites was completed, photos were taken of a representative area to show the completed work. As the work varies based on current conditions and there are many sites, some photos are not available.

### **Avoidance, Minimization and Mitigation Measures (AMMs)**

The pre-project notification submitted to the resource agencies for the 2019 work contained a list of AMMs applicable for each site in accordance with the prescriptions contained within the Biological Assessment completed for this program. At each of the sites the Environmental Coordinator oversaw the implementation of these practices as part of the overall project.

### **Appendices**

Appendix A: Program Maps

Appendix B: 2019 Project Sites and Work Completed

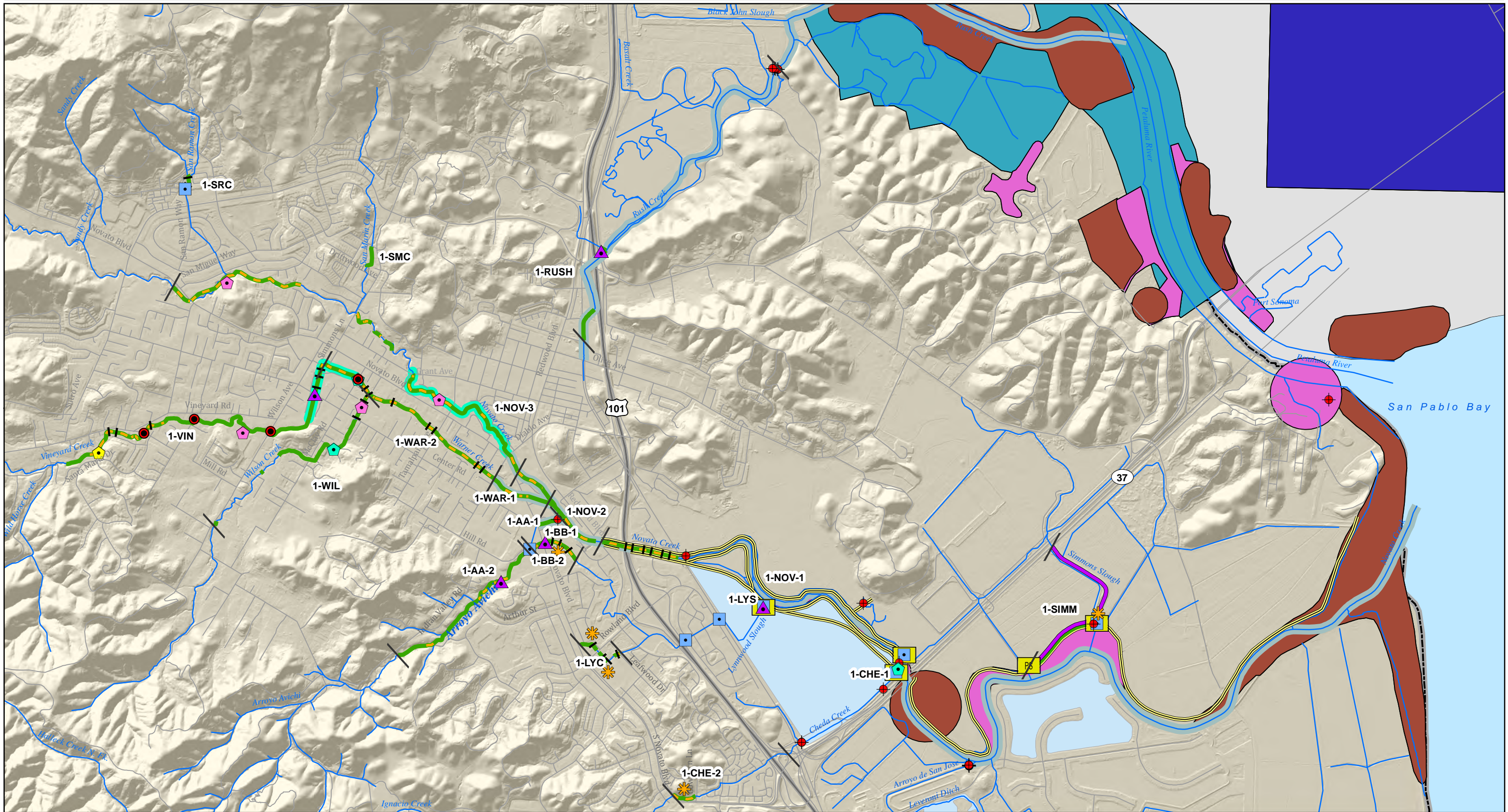
Appendix C: Before & After Photos of 2019 Sediment Removal and Vegetation Maintenance Projects

**APPENDIX A**  
**Program Maps**





# Marin County Flood Control District - Stream Maintenance Program



**Map**  
1

**Flood Control Zone 1 - Novato Lower Novato Creek Watershed**

- |                        |                  |                |                            |                         |
|------------------------|------------------|----------------|----------------------------|-------------------------|
| Fish Passage Barrier   | Sediment Removal | Tide/Flap Gate | California black rail      | <i>Restoration site</i> |
| Vegetation Maintenance | Sediment Removal | Pump Station   | California clapper rail    | Complete                |
| Levee Maintenance      | Erosion Control  | Trash Rack     | California red-legged frog | Ongoing                 |
| Tidal Stream           | Fuels Reduction  |                | Salt-marsh harvest mouse   | Proposed                |
| Streams                | Cattail cutting  |                | Complete                   |                         |

0 0.25 0.5 1 Mi

1:30,000

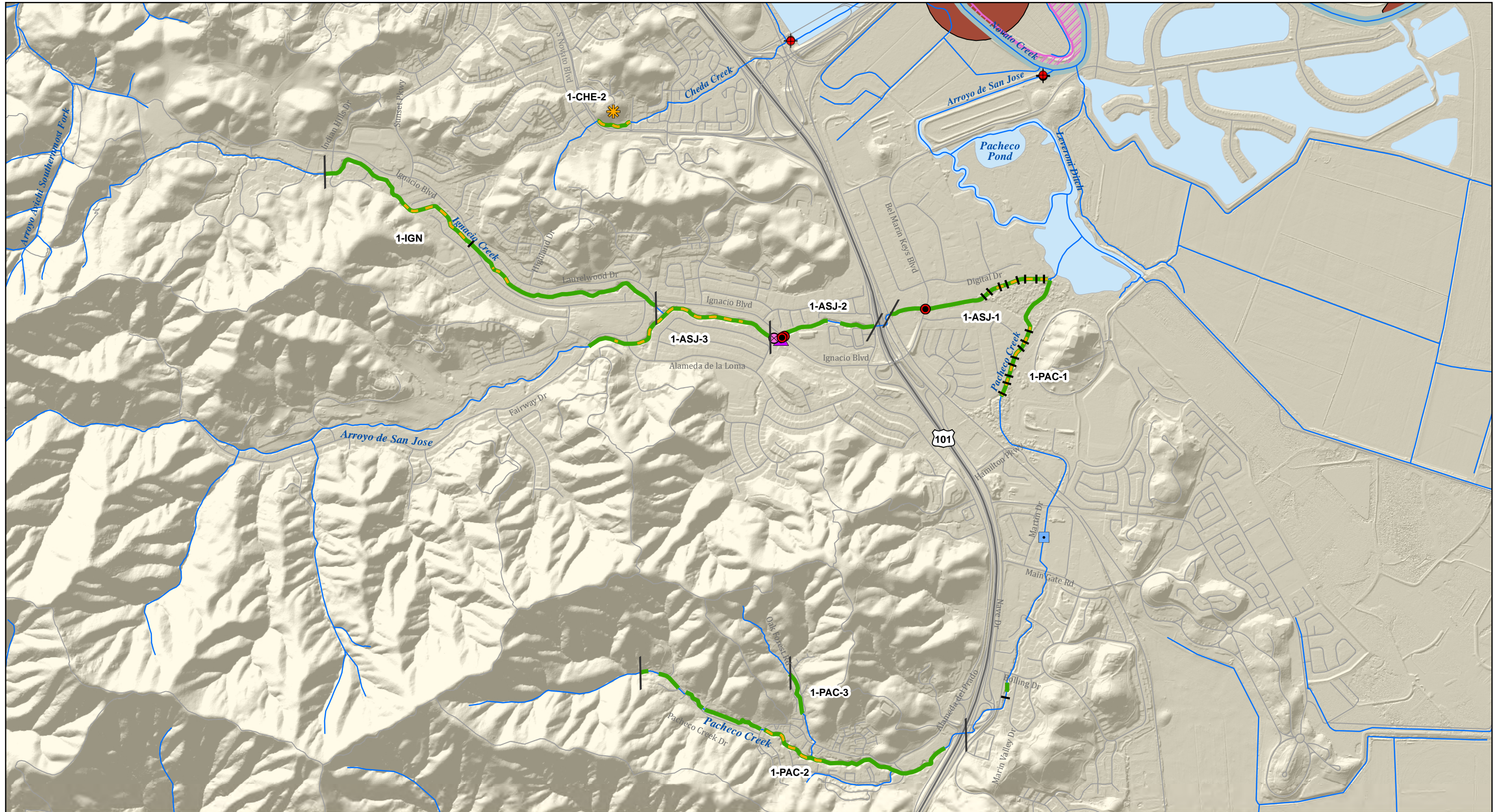


**Map 2**  
**Flood Control Zone 1 - Novato Upper Novato Creek Watershed**

Fish Passage Barrier	Sediment Removal	Tide/Flap Gate	Site Limit	California black rail	<i>Restoration site</i>
Vegetation Maintenance	Sediment Removal	Pump Station	California clapper rail	Complete	
Levee Maintenance	Erosion Control	Trash Rack	California red-legged frog	Ongoing	
Streams	Fuels Reduction		Salt-marsh harvest mouse	Proposed	
				Complete	

Scale: 1:20,000

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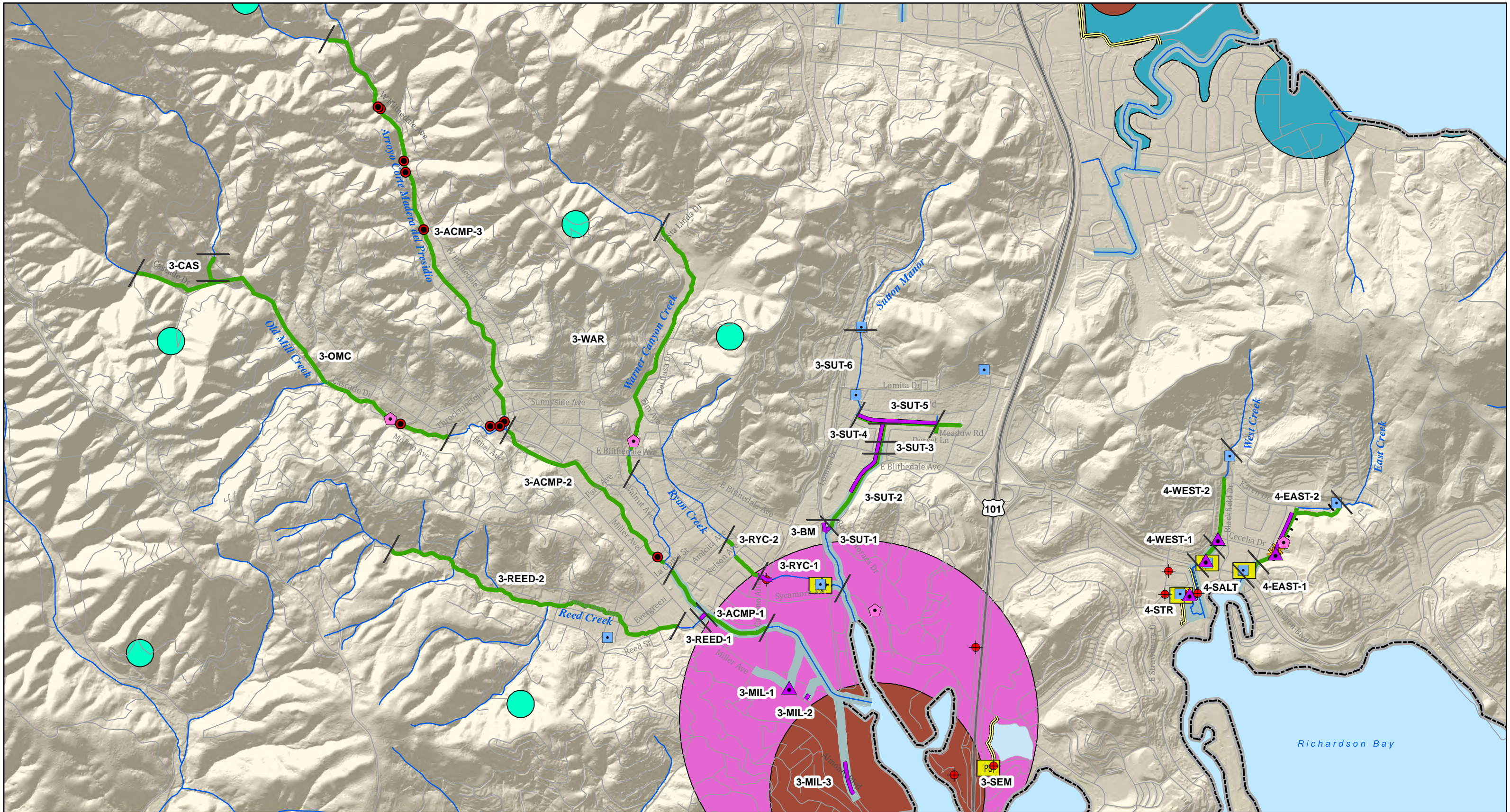


**Map 3**  
**Flood Control Zone 1 - Novato**  
**Pacheco Creek and Arroyo San Jose**

- |                          |                    |                  |                          |                       |                  |
|--------------------------|--------------------|------------------|--------------------------|-----------------------|------------------|
| ● Fish Passage Barrier   | ▲ Sediment Removal | ● Tide/Flap Gate | Site Limit               | California black rail | Restoration site |
| — Vegetation Maintenance | — Sediment Removal | PS Pump Station  | California clapper rail  | Complete              | Complete         |
| — Tidal Stream           | — Erosion Control  | Trash Rack       | salt-marsh harvest mouse | Ongoing               | Ongoing          |
| — Streams                | Fuel Reduction     | ⊗ Silt Basin     | Cattail cutting          | Proposed              | Proposed         |

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1:20,000

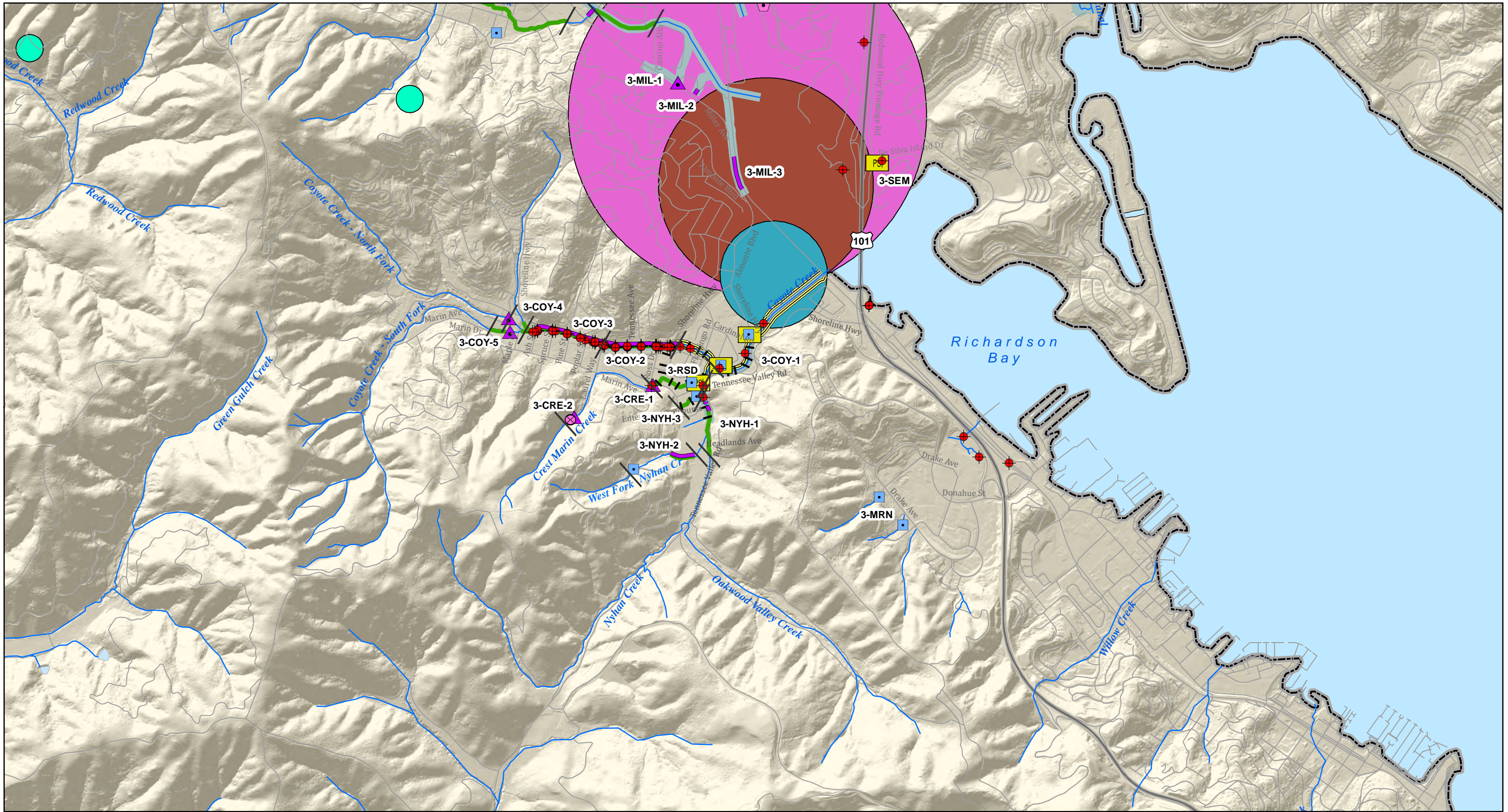
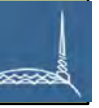


**Map 4**  
**Flood Control Zone 3 - Richardson Bay**  
**Arroyo Corte Madera del Presidio**  
**Flood Control Zone 4 - Bel Aire**  
**East and West Creeks**

- |                        |                  |                |            |                          |          |
|------------------------|------------------|----------------|------------|--------------------------|----------|
| Fish Passage Barrier   | Sediment Removal | Tide/Flap Gate | Site Limit | California black rail    | Complete |
| Cattail cutting        | Sediment Removal | Pump Station   |            | California clapper rail  | Ongoing  |
| Vegetation Maintenance | Fuels Reduction  | Trash Rack     |            | Northern spotted owl     | Proposed |
| Tidal Stream           |                  |                |            | salt-marsh harvest mouse |          |
| Streams                |                  |                |            |                          |          |

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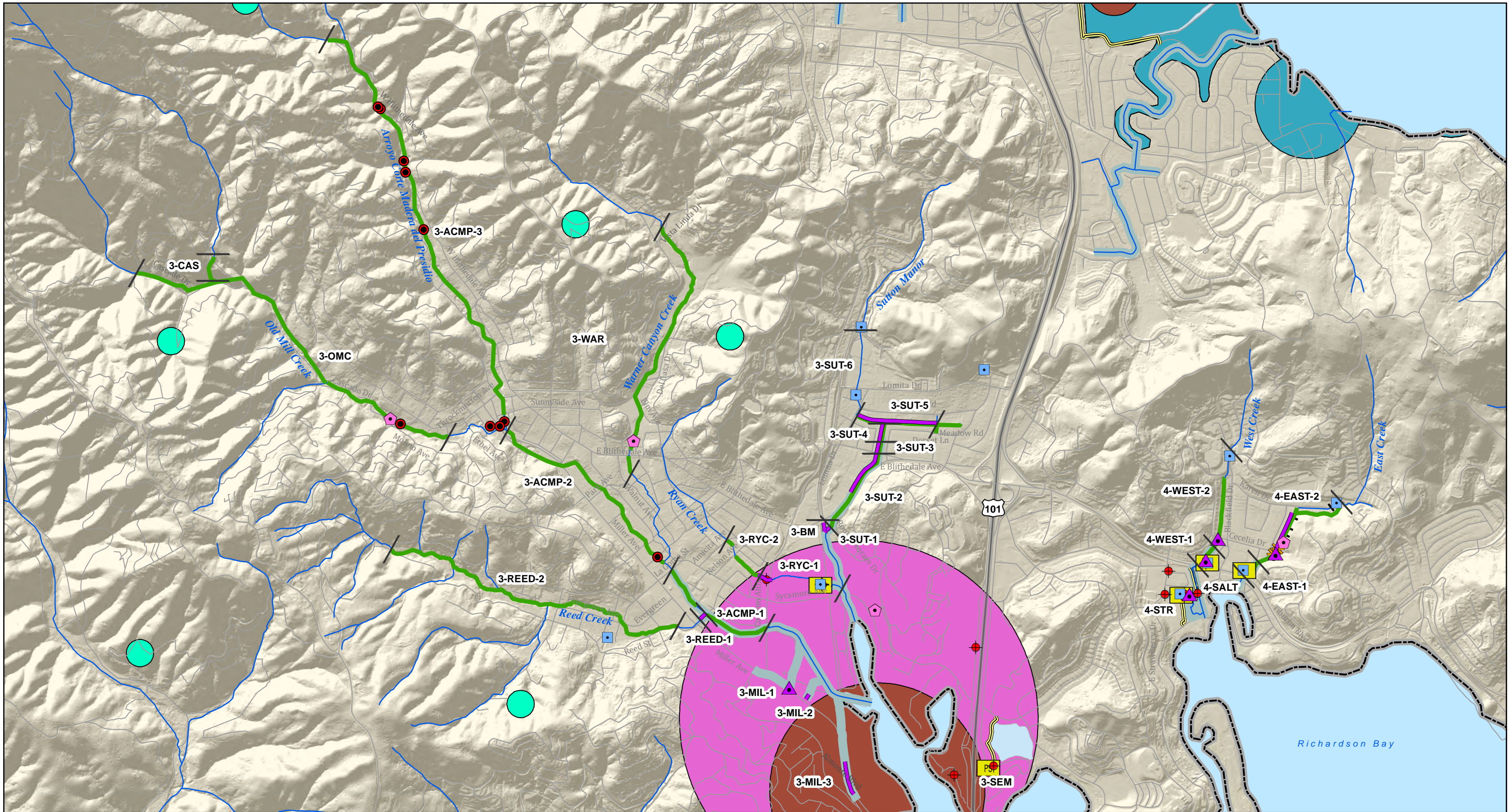


**Map 5**  
**Flood Control Zone 3 - Richardson Bay  
Coyote Creek Watershed**

Fish Passage Barrier	Sediment Removal	Tide/Flap Gate	California black rail	Complete
Vegetation Maintenance	Sediment Removal	Pump Station	California clapper rail	Ongoing
Levee	Erosion Control	Trash Rack	Northern spotted owl	Proposed
Tidal Stream	Fuels Reduction	Silt Basin	salt-marsh harvest mouse	
Streams	Site Location Limit			

Scale: 1:20,000

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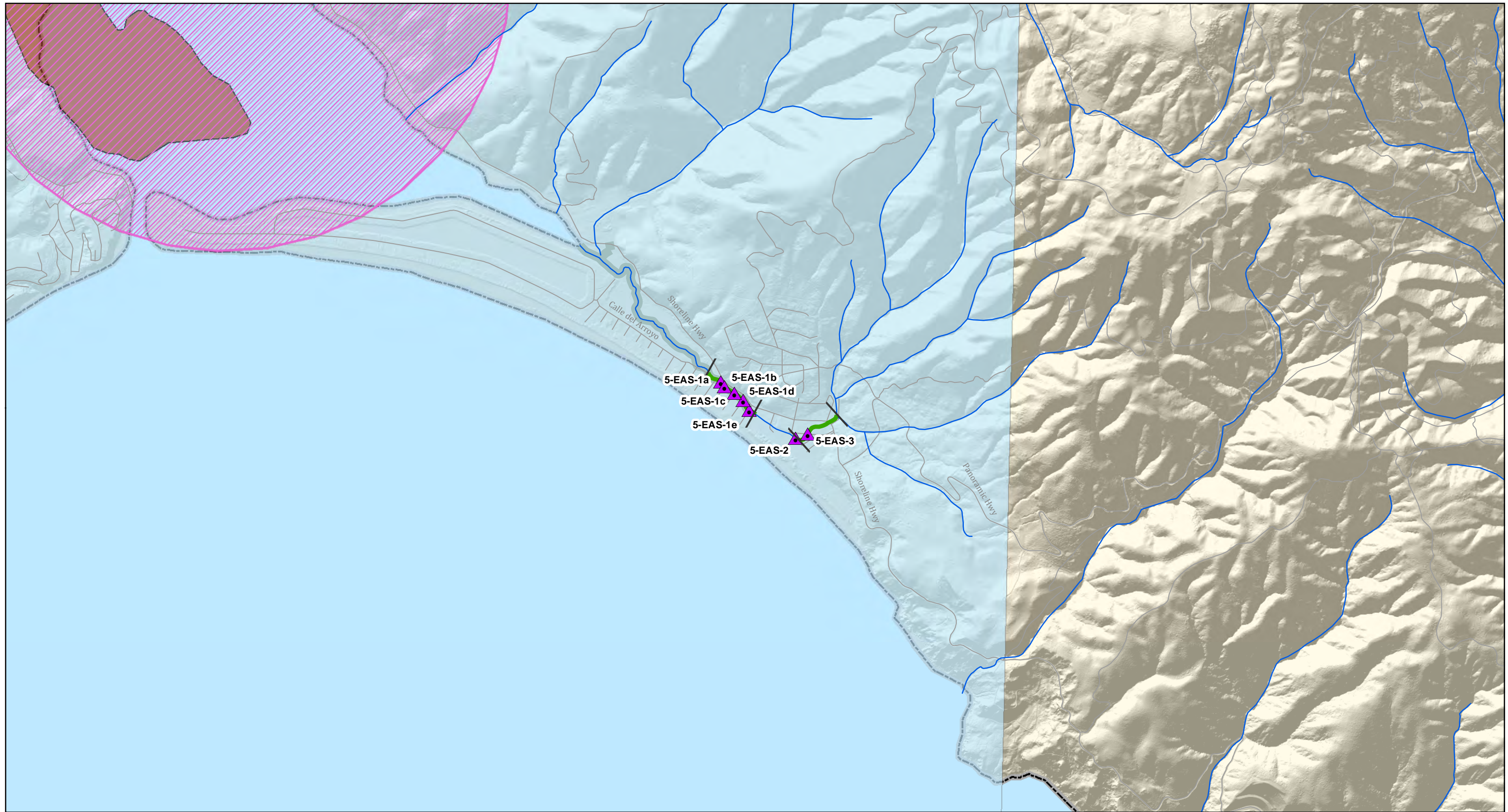


**Map 4**  
**Flood Control Zone 3 - Richardson Bay**  
**Arroyo Corte Madera del Presidio**  
**Flood Control Zone 4 - Bel Aire**  
**East and West Creeks**











- |                        |                  |                |            |                          |          |
|------------------------|------------------|----------------|------------|--------------------------|----------|
| Fish Passage Barrier   | Sediment Removal | Tide/Flap Gate | Site Limit | California black rail    | Complete |
| Cattail cutting        | Sediment Removal | Pump Station   |            | California clapper rail  | Ongoing  |
| Vegetation Maintenance | Fuels Reduction  | Trash Rack     |            | Northern spotted owl     | Proposed |
| Tidal Stream           |                  |                |            | salt-marsh harvest mouse |          |
| Streams                |                  |                |            |                          |          |

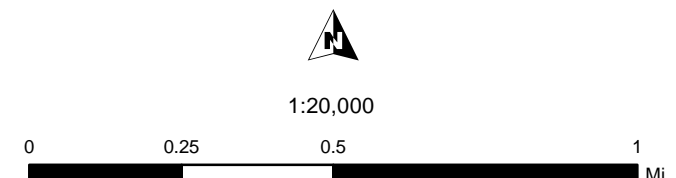
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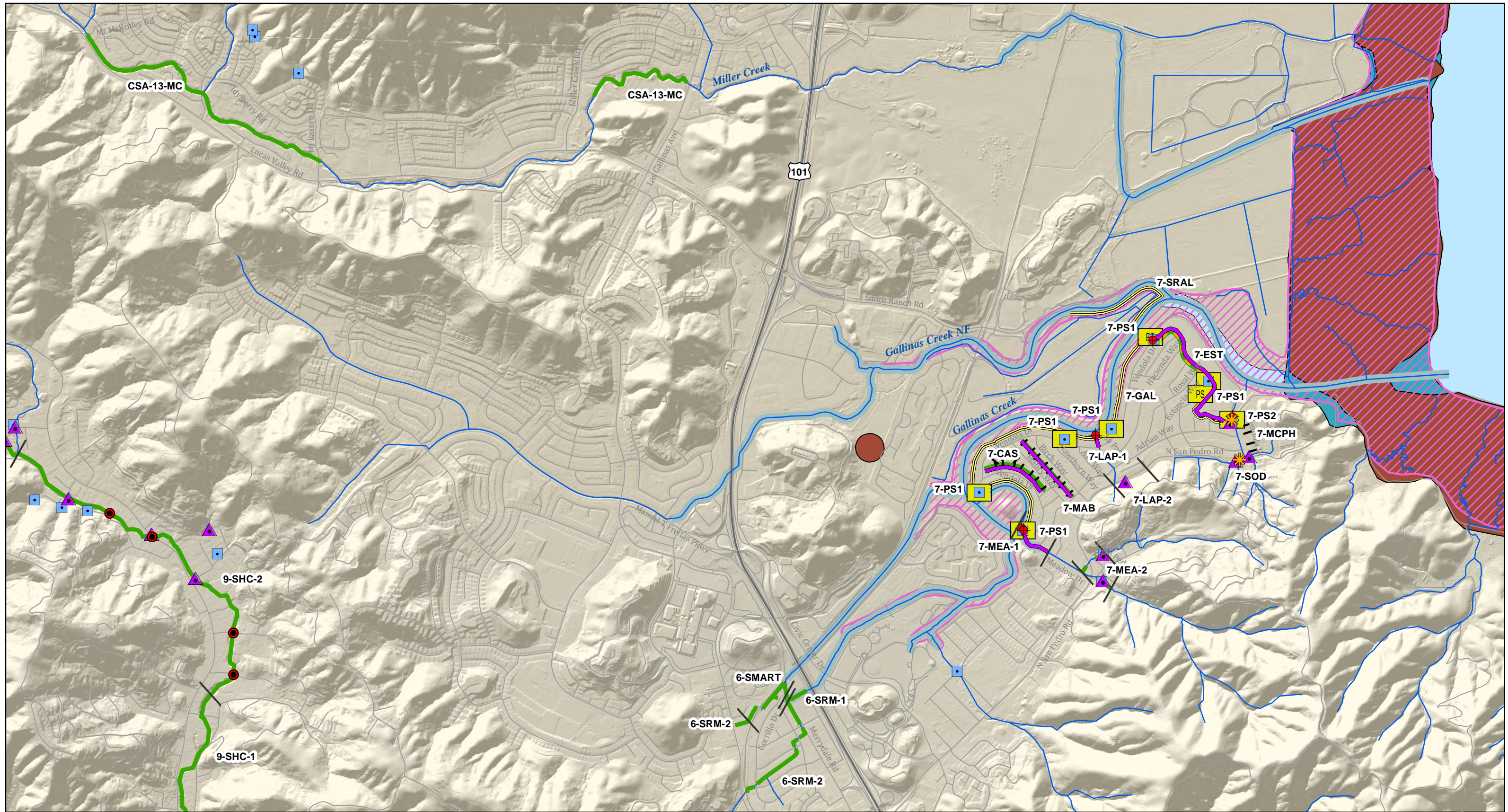
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**Map 10**  
**Flood Control Zone 5 - Stinson Beach**  
**Easkoot Creek**

-  Fish Passage Barrier
-  Vegetation Maintenance
-  Tidal Stream
-  Streams
-  Sediment Removal
-  Sediment Removal
-  Site Limit
-  California black rail
-  California clapper rail
-  Monarch butterfly





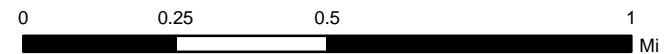
**Map 6**

**Flood Control Zone 7 - Santa Venetia**  
**Gallinas Creek**  
**CSA 13 - Miller Creek**

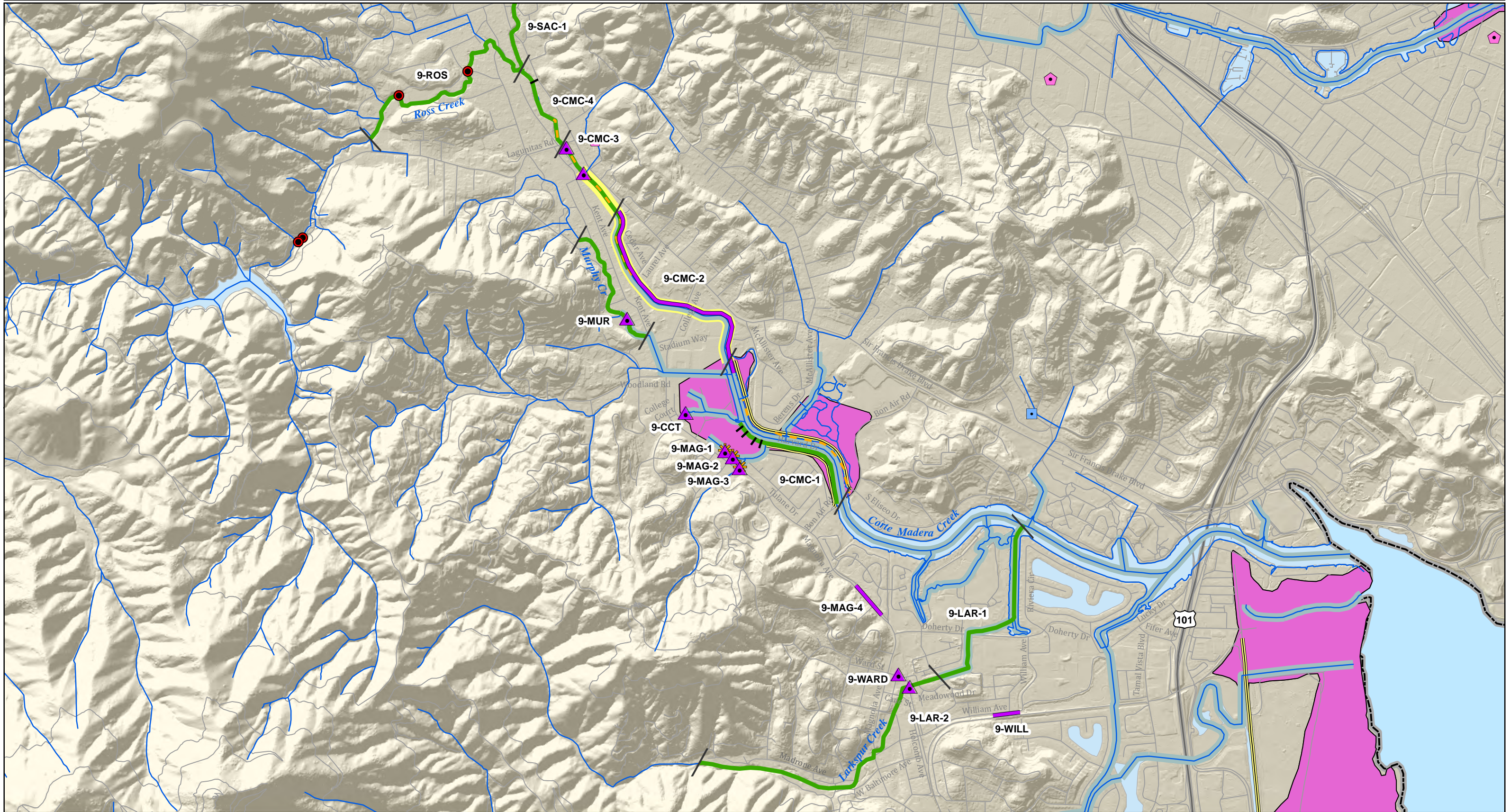
- |                        |                  |                |  |                          |
|------------------------|------------------|----------------|--|--------------------------|
| Fish Passage Barrier   | Sediment Removal | Tide/Flap Gate | Pump Station def query Owner NOT 'private' | California black rail    |
| Vegetation Maintenance | Sediment Removal | Trash Rack     | California clapper rail                    | salt-marsh harvest mouse |
| Levee                  | Cattail Cutting  |                |  |                          |
| Tidal Stream           | Erosion Control  |                |  |                          |
| Streams                | Fuels Reduction  |                |  |                          |



1:20,000







**Map 7**  
**Flood Control Zone 9 - Ross Valley**  
**Corte Madera, Larkspur, Murphy, and Ross Creeks**

- |                        |                  |                                       |  |
|------------------------|------------------|---------------------------------------|--|
| Fish Passage Barrier   | Sediment Removal | Site Limit                            | California clapper rail Restoration Site |
| Vegetation Maintenance | Sediment Removal | Northern spotted owl Restoration Site | Complete                                 |
| Levee                  | Erosion Control  | Ongoing                               | Proposed                                 |
| Tidal Stream           | Fuels Reduction  |                                       |  |
| Streams                |                  |                                       |  |

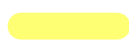



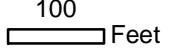


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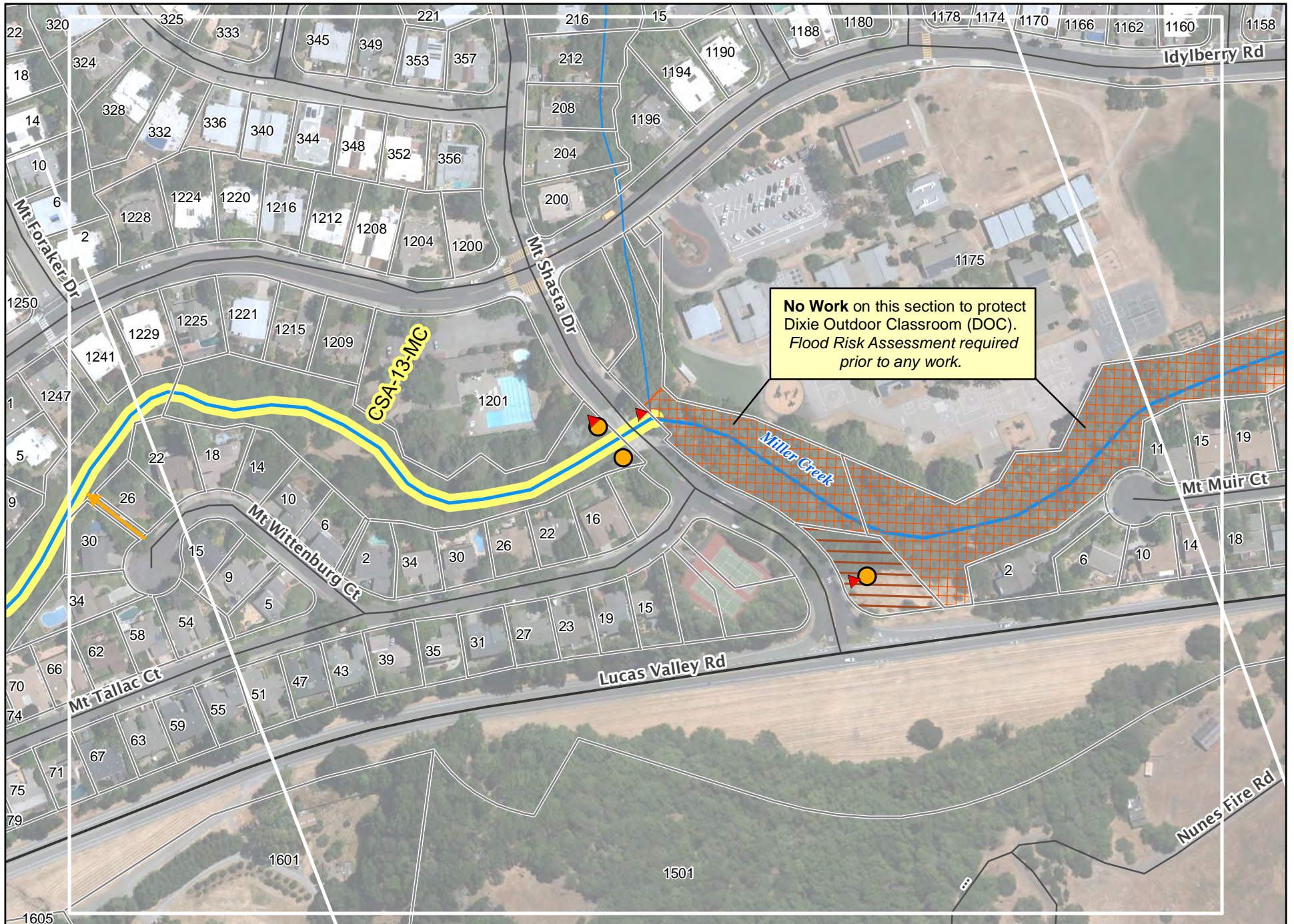
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### Miller Creek Reach 1 Page 1

Marin County Flood Control and Water Conservation District, 2014  
 MAP IS REPRESENTATIONAL ONLY. DATA ARE NOT SURVEY ACCURATE.

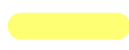



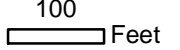



	Vegetation Maintenance		Access Point		Stage Pile Gate	  1:2,400
	Access Route		Pump Station			

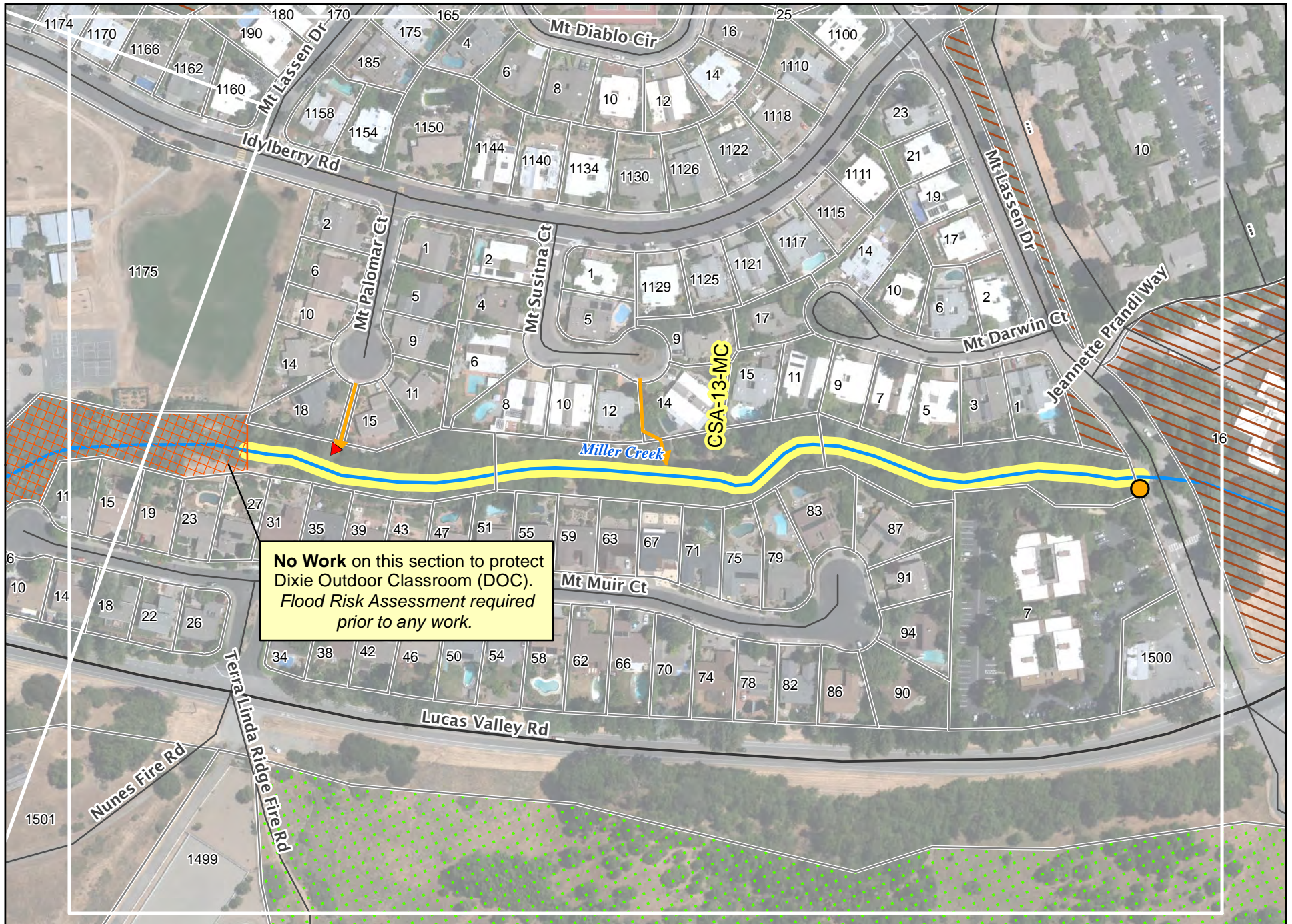


**No Work** on this section to protect Dixie Outdoor Classroom (DOC).  
*Flood Risk Assessment required prior to any work.*

**Miller Creek Reach 1 Page 2**

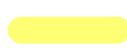
Marin County Flood Control and Water Conservation District, 2014  
 MAP IS REPRESENTATIONAL ONLY. DATA ARE NOT SURVEY ACCURATE.

	Vegetation Maintenance		Access Point		Stage Pile Gate	  1:2,400
	Access Route		Gate		Pump Station	



**Miller Creek Reach 1 Page 3**

Marin County Flood Control and Water Conservation District, 2014  
MAP IS REPRESENTATIONAL ONLY. DATA ARE NOT SURVEY ACCURATE.



Vegetation  
Maintenance



Access Point  
Access Route



Stage Pile  
Gate



Pump Station



100  
Feet  
1:2,400

**APPENDIX B**  
**2019 Project Sites and Work Completed**



Site ID	CREEK	2019 VEG REMOVAL (LF)	2019 ECO UPLIFT NEEDED (SF)	2019 ECO UPLIFT (SF)	MONITOR (LF)	2019 SED REMOVED (LF)	2019 SED REMOVED (CY)
<b>FLOOD CONTROL ZONE 1 - NOVATO</b>							
1-AA-1	Arroyo Avichi	12.5	125	412.5	-	-	-
1-AA-2	Arroyo Avichi	43	430	4262.5	32.5	-	-
1-ASJ-1	Arroyo de San Jose	143.5	1435	31088	36.5	-	-
1-ASJ-2	Arroyo de San Jose	104	728	275	52.5	-	-
1-ASJ-3	Arroyo de San Jose	201	1005	1524.5	10	-	-
1-BB-1	Baccaglio Basin	2.5	25	562.5	-	-	-
1-BB-2	Baccaglio Basin	-	-	12.5	-	-	-
1-CHE-2	Cheda Creek	9.5	66.5	400	4	-	-
1-IGN	Ignacio Creek	78	546	1337.5	14	-	-
1-LYC	Lynwood Creek	120	1200	2000	47.5	-	-
1-NOV-1	Novato Creek	-	-	62.5	-	-	-
1-NOV-2	Novato Creek	64	640	125	2.5	-	-
1-NOV-3	Novato Creek	147	1029	7081.9	22.5	-	-
1-PAC-1	Pacheco Creek	32	320	350	-	-	-
1-PAC-2	Pacheco Creek	50	350	7819.2	15	-	-
1-RUSH	Rush Creek	36	360	237.5	-	-	-
1-SMC	San Marin Creek	-	-	62.5	-	-	-
1-SRC	San Ramon Creek	15	75	-	22.5	-	-
1-VIN	Vineyard Creek	200	1000	1337.5	84	75	160
1-WAR-1	Warner Creek	236.5	2365	75	-	-	-
1-WAR-2	Warner Creek	189	1323	1900	5.5	-	-
1-WIL	Wilson Creek	-	-	137.5	37.5	-	-
<b>Zone 1 Total</b>		<b>1,684</b>	<b>13,023</b>	<b>61,063</b>	<b>387</b>	<b>75</b>	<b>160</b>

Site ID	CREEK	2019 VEG REMOVAL (LF)	2019 ECO UPLIFT NEEDED (SF)	2019 ECO UPLIFT (SF)	MONITOR (LF)	2019 SED REMOVED (LF)	2019 SED REMOVED (CY)
<b>FLOOD CONTROL ZONE 3 - RICHARDSON BAY</b>							
3-CRE-2	Crest Marin Creek	-	-	-	-	25	120
3-NYH-1	Nyhan Creek	-	-	-	-	140	222
3-NYH-2	Nyhan Creek WF	-	-	-	-	450	16
3-SUT-2	Sutton Manor	-	-	-	-	600	140
<b>Zone 3 Total</b>		-	-	-	-	<b>1215</b>	<b>498</b>
<b>FLOOD CONTROL ZONE 4 - BEL AIRE AND STRAWBERRY CIRCLE</b>							
4-EAST-2	East Creek	49.5	495	62.5	1.5	-	-
4-WEST-2	West Creek	25.5	127.5	62.5		-	-
<b>Zone 4 Total</b>		<b>75</b>	<b>622.5</b>	<b>125</b>	<b>1.5</b>	-	-
<b>FLOOD CONTROL ZONE 5 - STINSON BEACH</b>							
5-EAS-3	Easkoot Creek	75	375	-	-	-	-
<b>FLOOD CONTROL ZONE 7 - SANTA VENETIA</b>							
7-SOD	South Fork	-	-	-	-	100	64
<b>FLOOD CONTROL ZONE 9 - ROSS VALLEY</b>							
9-CMC-3	Creek	-	-	-	-	800	3
9-MAG-3	Larkspur Creek	-	-	-	-	20	10
<b>Zone 9 Total</b>		-	-	-	-	<b>820</b>	<b>13</b>
<b>COUNTY SERVICE AREA 13 - UPPER LUCAS VALLEY</b>							
CSA-13-MC	Miller Creek	212.5	2125	1725	57.5		
<b>All Zone Total</b>		<b>2,046</b>	<b>16,145</b>	<b>62,913</b>	<b>446</b>	<b>2,210</b>	<b>735</b>



**APPENDIX C**  
**Before & After Photos**  
**Sediment Removal and Vegetation Maintenance**



## SEDIMENT REMOVAL

### Zone 1

Vineyard Creek (1-VIN)

Pre-project



Post-project



### Zone 3

Crest Marin Creek, Lauren Basin (3-CRE-2)

Pre-project



Post-project



Nyhan Creek (3-NYH-1)  
**Pre-project**



**Post-project**



Nyhan Creek West Fork - Tam Valley Elementary School (3-NYH-2)  
**Pre-project**



**Post-project**



Sutton Manor (3-SUT-2)  
Pre-project



Post-project



Area 3 (above): confluence of Sutton Manor Creek Channel and an un-named tributary.



Area 4 (above): 60 feet downstream of the Sutton Manor confluence with the un-named tributary; left is pre-project, right is post-project.



Area 5 (above): upstream of double 6-foot metal culvert on right bank; left is pre-project, right is post-project.



**Area 8 (above):** ~130 feet downstream from the steel culvert outlet (Area 5); left is pre-project, right is post-project.

**Zone 7**  
**Sunny Oaks Drain (7-SOD)**  
**Pre-project**



**North Section (above)**

**Post-project**



**South Section (above)**



**Zone 9**

Corte Madera Creek (9-CMC-3)

**Pre-project**



**Post-project**



Larkspur Creek (9-MAG-3)

**Pre-project**



**Post-project**



# VEGETATION REMOVAL

## Zone 1

Arroyo Avichi Creek (1-AA-1)

**Pre-project**



**Post-project**



Arroyo Avichi Creek (1-AA-2)

**Pre-project**



**Post-project**





Arroyo de San Jose (1-ASJ-1)

**Pre-project**



**Post-project**



Arroyo de San Jose (1-ASJ-2)

**Pre-project**



**Post-project**



Arroyo de San Jose (1-ASJ-3)

**Pre-project**



**Post-project**



Baccaglio Basin (1-BB-1)  
Pre-project

Photo Unavailable

Post-project

Photo Unavailable  
Cut small branch blocking the channel flow.

Cheda Creek (1-CHE-2)  
Pre-project



Post-project



Ignacio Creek (1-IGN)  
Pre-project



Post-project



Lynwood Creek (1-LYC)

**Pre-project**



**Post-project**



Novato Creek (1-NOV-1)

**Pre-project**

Photo Unavailable

**Post-project**

Photo Unavailable

Removed small black acacia tree in creek (eco-lift).

Novato Creek (1-NOV-2)

**Pre-project**



**Post-project**



Novato Creek (1-NOV-3)  
Pre-project



Post-project



Pacheco Creek (1-PAC-1)  
Pre-project



Post-project



Pacheco Creek (1-PAC-2)  
Pre-project



Post-project



Rush Creek (1-RUSH)

**Pre-project**



**Post-project**



San Marin Creek (1-SMC)

**Pre-project**



**Post-project**

**Photo Unavailable**

English Ivy was removed from the trees (eco-uplift).

San Ramon Creek (1-SRC)

**Pre-project**

**Photo Unavailable**

**Post-project**

**Photo Unavailable**

Cut and cleared low branches of willows and palms.

Vineyard Creek (1-VIN)

Pre-project



Post-project



Warner Creek (1-WAR-1)

Pre-project



Post-project



Warner Creek (1-WAR-2)

Pre-project



Post-project



**Wilson Creek (1-WIL)**  
Pre-project



Post-project



**Zone 4**  
East Creek (4-EAS-2)  
Pre-project



Post-project



West Creek (4-WEST-2)

Pre-project



Post-project



**Zone 5**

Easkoot Creek (5-EAS-3)

Pre-project



Post-project





**CSA-13**

Miller Creek (CSA-13-MC)

**Pre-project**



**Post-project**

