

San Gregorio Creek



Location	• San Mateo County
Watershed Area	• 52.0 Square Miles
Potential Habitat	• 36.7 Stream Miles
Vegetation	• 32% Coniferous, 39% Shrubland, 23% Grassland
Erodability	• Moderate
Ownership Patterns	• 98% Private; 2% Public
Dominant Land Uses	• Rural Residential, Recreation., Agricultural
Housing Density	• Low to Moderate
TMDL Pollutants	• Pathogens, Sediment



San Gregorio Lagoon
Photo by Kristine Atkinson

San Gregorio Creek Coho Salmon: Nearly Extirpated



Recovery Goals

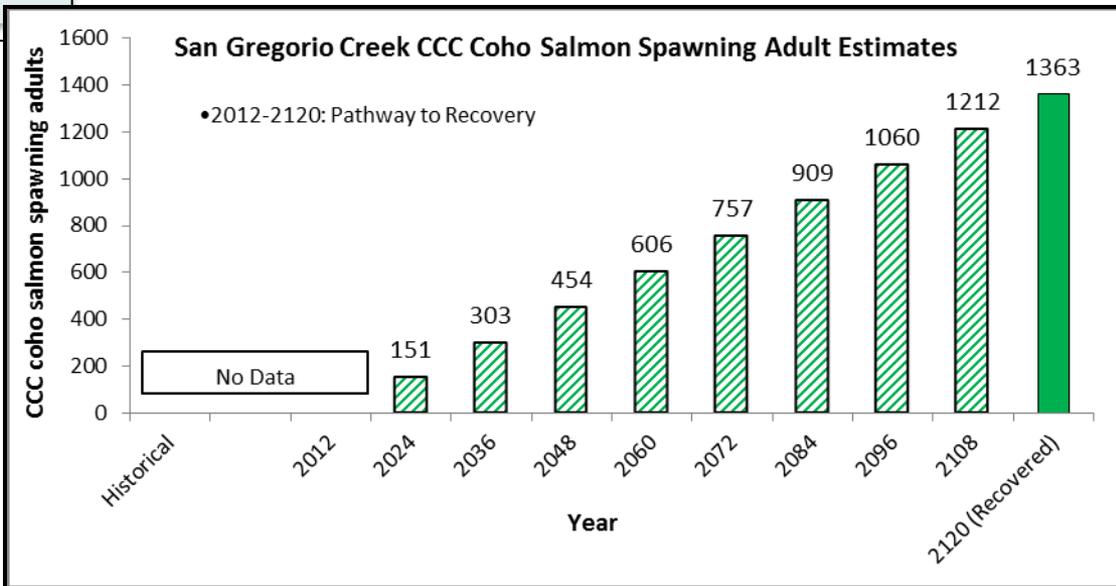
- ✓ Implement a monitoring program to evaluate the performance of recovery efforts

**San Gregorio Creek
Adult Spawner Targets**

**Downlisting to Threatened
682**

**Recovery
1,363**

STEELHEAD: YES
CHINOOK SALMON: NO



Current Instream, Watershed and Population Conditions



Preventing Extinction & Improving Conditions

Priority 1: Immediate Restoration Actions

- Promote restoration projects designed to create or restore alcove, backchannel, ephemeral tributary, or other seasonal habitats
- Educate landowners, land managers, and County staff on the importance of LWD for coho salmon conservation and recovery
- Provide incentives to water rights holders willing to convert some or all of their water right to instream uses
- Continue to fund the maintenance and operation of the San Gregorio gauge
- Support SWRCB in regulating the use of streamside wells and groundwater. Request the SWRCB review and/or modify water use based on the needs of coho salmon and authorized diverters

Priority 2 & 3: Long-Term Restoration Actions

- Target habitat restoration and enhancement projects that will function between winter base flow and flood stage
- Decommission elevated road alignments through riparian zones or adjacent to stream channels
- Install LWD, boulders, and other instream features to increase habitat complexity and improve pool frequency and depth
- Promote off-channel storage to reduce impacts of water diversion
- Re-establish a naturally reproducing run of coho salmon in appropriate subwatersheds



Recovery Partners
San Mateo RCD, CEMAR



Future Threats



Reducing Future Threats

Priority 1: Immediate Threat Abatement Actions

- Discourage forest-to-vineyard land or rural residential conversions
- Protect channel migration zones and their riparian areas by designing new roads and developments to allow streams to meander in historical patterns
- Conduct annual inspections of all roads prior to winter and correct conditions that are likely to deliver sediment to streams
- Ensure all water diversions in the watershed are in compliance with all applicable laws and policies
- Ensure current and future water diversions (surface and groundwater) do not further impair estuary water quality conditions

Priority 2 & 3: Long-Term Threat Abatement Actions

- New development should meet a zero net increase in storm-water runoff, changes in duration, or magnitude of peak flow.
- Maintain intact and properly functioning riparian buffers
- Encourage County to continue implementation of the San Mateo County Road Maintenance Manual
- Request the SWRCB consult with CDFG and NMFS on the issuance of water rights permits



Streambank erosion in San Gregorio Creek
Photo by Kristine Atkinson

Conservation Highlights

- Mid Peninsula Open Space District is performing sediment abatement programs
- Trout Unlimited and the Center for Ecosystem Management and Restoration (in cooperation with the California Coastal Conservancy) are operating multiple streamflow gauges in the watershed

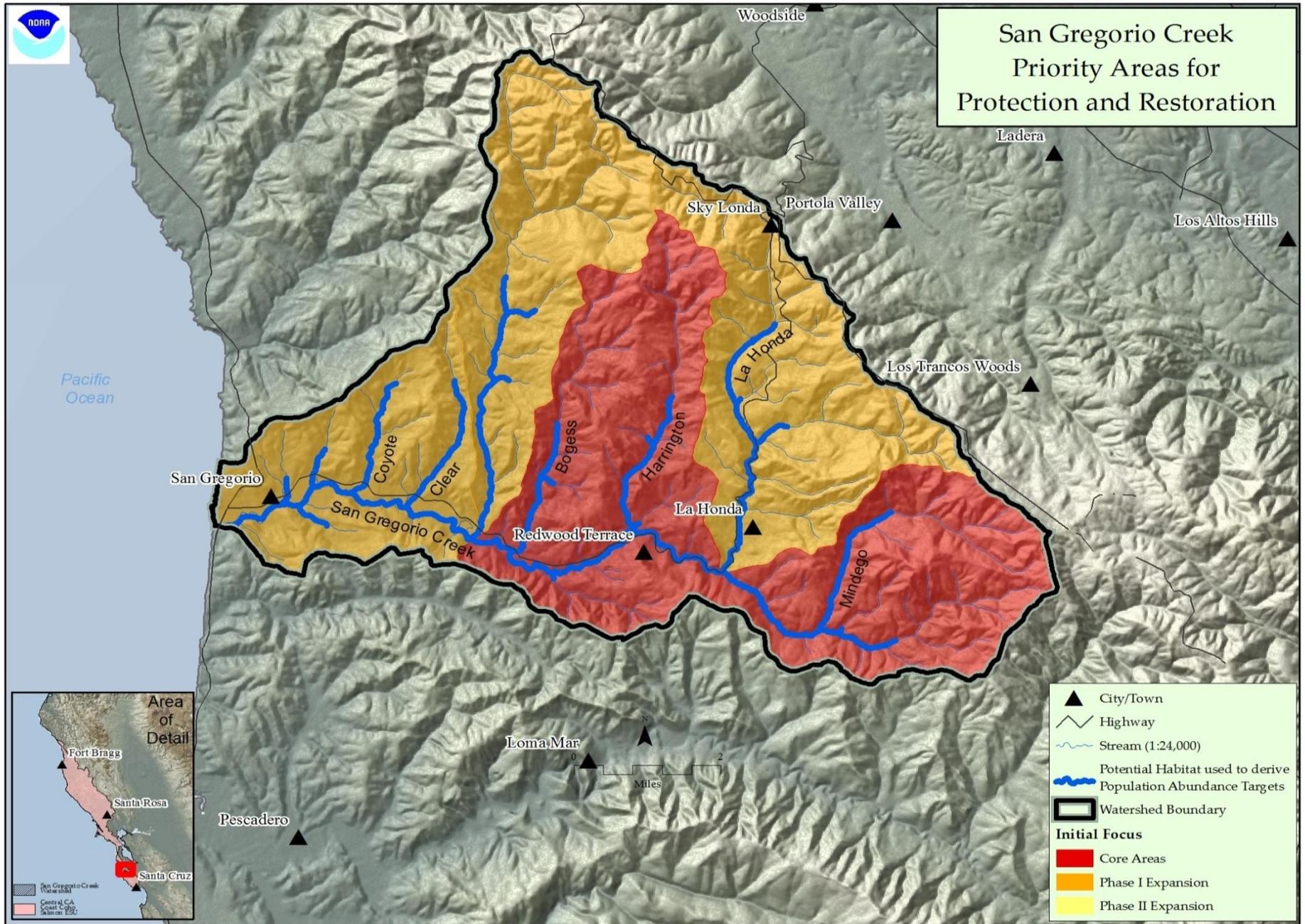


Figure 1: Map of San Gregorio Creek
San Gregorio Creek

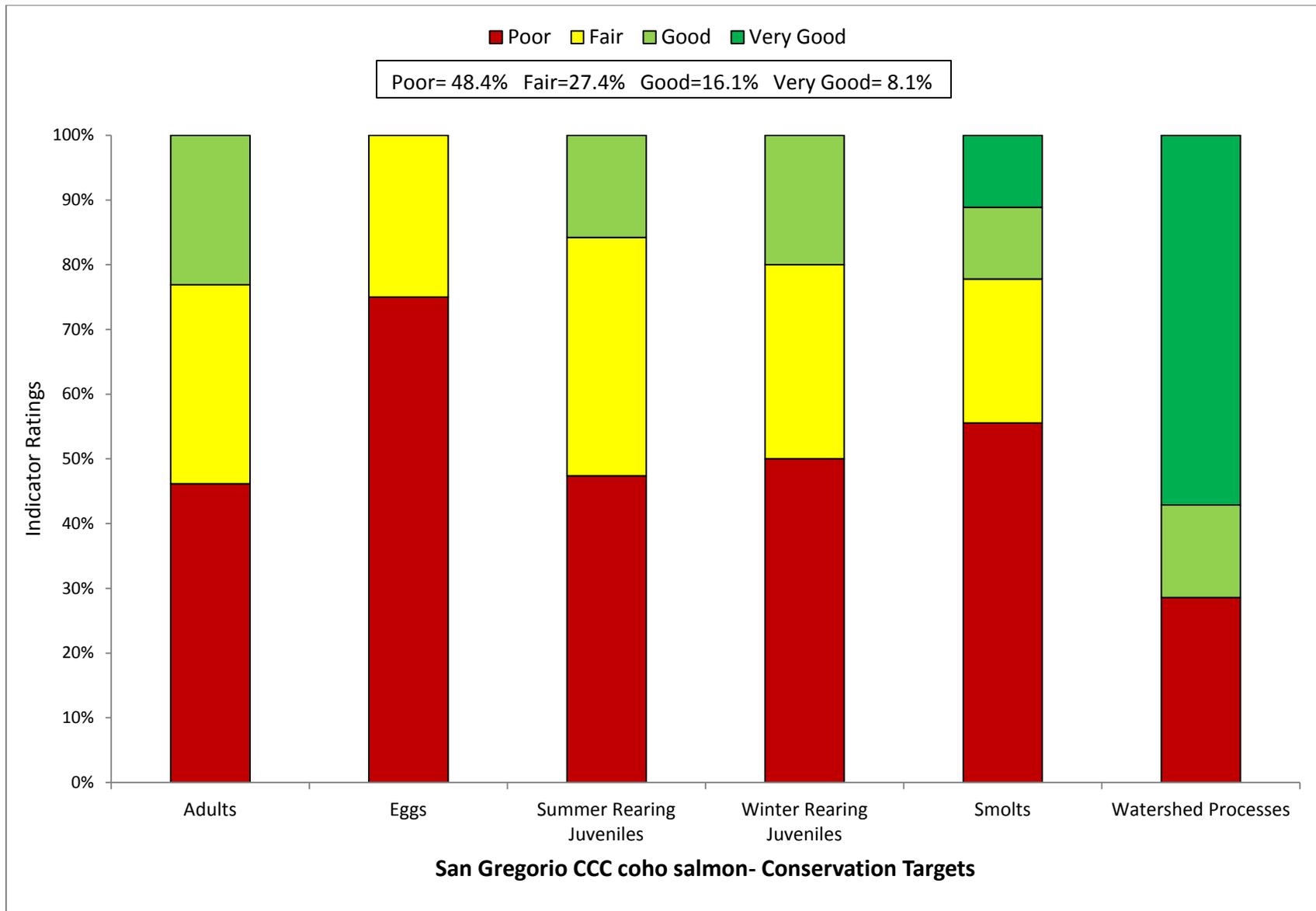


Figure 2: Viability Results by Lifestage

Table 1: CAP Viability Results ~ San Gregorio Creek

Target	Attribute	Indicator	Result	Rating	Method	Desired Criteria
Adults	Habitat Complexity	Large Wood Frequency (BFW 0-10 meters)	1.35 Key Pieces/ 100m	Poor	NMFS Expert Estuary/Lagoon Panel	6 to 11 key pcs/100m
Adults	Habitat Complexity	Large Wood Frequency (BFW 10-100 meters)	<1 Key Pieces/ 100m	Poor	NMFS Expert Estuary/Lagoon Panel	1.3 to 4 Key Pieces/100 meters
Adults	Habitat Complexity	Pool/Riffle/Flatwater Ratio	71% streams 82% IP-km (>30% Pools; >20% Riffles)	Fair	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Adults	Habitat Complexity	Shelter Rating	0% of streams/ IP-km (>80 stream average)	Poor	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km (>80 stream average)
Adults	Hydrology	Passage Flows	Risk Factor Score =83	Poor	SEC Analysis/CDFG Data	NMFS Flow Protocol: Risk Factor Score 35-50
Adults	Passage/Migration	Passage at Mouth or Confluence	50% of IP-km to 74% of IP-km accessible	Fair	SEC Analysis/CDFG Data	75% of IP-Km to 90% of IP-km
Adults	Passage/Migration	Physical Barriers	78.9% of IP-km accessible	Good	SEC Analysis/CDFG Data	75% of IP-Km to 90% of IP-km
Adults	Riparian Vegetation	Tree Diameter (North of SF Bay)	NA	0	SEC Analysis/CDFG Data	55 - 69% Class 5 & 6 across IP-km
Adults	Riparian Vegetation	Tree Diameter (South of SF Bay)	≥80% Density rating "D" across IP-km	Good	SEC Analysis/CDFG Data	≥80% Density rating "D" across IP-km
Adults	Sediment	Quantity & Distribution of Spawning Gravels	75% of IP-km to 90% of IP-km accessible	Good	SEC Analysis/CDFG Data	75% of IP-Km to 90% of IP-km
Adults	Velocity Refuge	Floodplain Connectivity	50-80% Response Reach Connectivity	Fair	SEC Analysis/CDFG Data	>80% Response Reach Connectivity
Adults	Water Quality	Toxicity	Sublethal or Chronic	Fair	SEC Analysis/CDFG Data	No Acute or Chronic
Adults	Water Quality	Turbidity	<50% of streams/ IP-km maintains severity score of 3 or lower	Poor	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower
Adults	Viability	Density	0 spawner per IP-km	Poor	SEC Analysis/CDFG Data	low risk spawner density per Spence (2008)
Eggs	Hydrology	Flow Conditions (Instantaneous Condition)	Risk Factor Score =58	Fair	SEC Analysis/CDFG Data	NMFS Flow Protocol: Risk Factor Score 35-50
Eggs	Hydrology	Redd Scour	Risk Factor Score =83	Poor	SEC Analysis/CDFG Data	NMFS Flow Protocol: Risk Factor Score 35-50

Eggs	Sediment	Gravel Quality (Bulk)	>17% (0.85mm) and >30% (6.4mm)	Poor	NMFS Instream Flow Analysis	12-14% (0.85mm) and <30% (6.4mm)
Eggs	Sediment	Gravel Quality (Embeddedness)	29% of streams 19% by IP-km (>50% stream average scores of 1 & 2)	Poor	NMFS Instream Flow Analysis	75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2)
Summer Rearing Juveniles	Estuary/Lagoon	Quality & Extent	Impaired but functioning	Fair	NMFS Instream Flow Analysis	Properly Functioning Condition
Summer Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 0-10 meters)	1.35 Key Pieces/ 100m	Poor	NMFS Instream Flow Analysis	6 to 11 key pcs/100m
Summer Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 meters)	<1 Key Pieces/100m	Poor	NMFS Instream Flow Analysis	1.3 to 4 Key Pieces/100 meters
Summer Rearing Juveniles	Habitat Complexity	Percent Primary Pools	14% streams 42% IP-km (>49% of pools are primary pools)	Poor	NMFS Instream Flow Analysis	75% to 89% of streams/ IP-Km (>49% of pools are primary pools)
Summer Rearing Juveniles	Habitat Complexity	Pool/Riffle/Flatwater Ratio	71% streams 82% IP-km (>30% Pools; >20% Riffles)	Fair	NMFS Instream Flow Analysis	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Summer Rearing Juveniles	Habitat Complexity	Shelter Rating	0% of streams/ IP-km (>80 stream average)	Poor	NMFS Instream Flow Analysis	75% to 90% of streams/ IP-Km (>80 stream average)
Summer Rearing Juveniles	Hydrology	Flow Conditions (Baseflow)	Risk Factor Score =>75	Poor	NMFS Instream Flow Analysis	NMFS Flow Protocol: Risk Factor Score 35-50
Summer Rearing Juveniles	Hydrology	Flow Conditions (Instantaneous Condition)	Risk Factor Score =51-75	Fair	NMFS Watershed Characterization	NMFS Flow Protocol: Risk Factor Score 35-50
Summer Rearing Juveniles	Hydrology	Number, Condition and/or Magnitude of Diversions	10.38 Diversions/10 IP-km	Poor	NMFS Watershed Characterization	0.01 - 1 Diversions/10 IP km
Summer Rearing Juveniles	Passage/Migration	Passage at Mouth or Confluence	50% of IP-km to 74% of IP-km accessible	Fair	NMFS Watershed Characterization	75% of IP-Km to 90% of IP-km
Summer Rearing Juveniles	Passage/Migration	Physical Barriers	77.5 of IP-km accessible	Good	Population Profile/BPJ	75% of IP-Km to 90% of IP-km
Summer Rearing Juveniles	Riparian Vegetation	Canopy Cover	22% streams 11% IP with average canopy >85%	Fair	SEC or PAD/CDFG Data	75% to 90% of streams/ IP-Km (>85% average stream canopy)
Summer Rearing Juveniles	Riparian Vegetation	Tree Diameter (North of SF Bay)	NA	0	Population Profile/BPJ	55 - 69% Class 5 & 6 across IP-km
Summer Rearing Juveniles	Riparian Vegetation	Tree Diameter (South of SF Bay)	≥80% Density rating "D" across IP-km	Good	SEC or PAD/CDFG Data	≥80% Density rating "D" across IP-km
Summer Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	22% streams 23% IP-km (>50% stream average scores of 1 & 2)	Poor	SEC or PAD/CDFG Data	75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2)

Summer Rearing Juveniles	Water Quality	Temperature (MWT)	50 to 74% IP-km (<16 C MWT)	Fair	Population Profile/BPJ	75 to 89% IP km (<16 C MWT)
Summer Rearing Juveniles	Water Quality	Toxicity	Sublethal or Chronic	Fair	NMFS Watershed Characterization/CWHR	No Acute or Chronic
Summer Rearing Juveniles	Water Quality	Turbidity	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower	Good	NMFS Watershed Characterization/CWHR	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower
Summer Rearing Juveniles	Viability	Density	0 fish/meter^2	Poor	SEC Analysis/CDFG Data	0.5 - 1.0 fish/meter^2
Summer Rearing Juveniles	Viability	Spatial Structure	<50% of Historical Range	Poor	NMFS Watershed Characterization/CWHR	75-90% of Historical Range
Winter Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 0-10 meters)	1.35 Key Pieces/ 100m	Poor	NMFS Watershed Characterization/CWHR	6 to 11 key pcs/100m
Winter Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 meters)	<1 Key Pieces/ 100m	Poor	NMFS Watershed Characterization/CWHR	1.3 to 4 Key Pieces/100 meters
Winter Rearing Juveniles	Habitat Complexity	Pool/Riffle/Flatwater Ratio	71% streams 82% IP-km (>30% Pools; >20% Riffles)	Fair	NMFS Watershed Characterization/CWHR	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Winter Rearing Juveniles	Habitat Complexity	Shelter Rating	0% of streams/ IP-km (>80 stream average)	Poor	CDF Vegetation Maps/BPJ	75% to 90% of streams/ IP-Km (>80 stream average)
Winter Rearing Juveniles	Passage/Migration	Physical Barriers	77.5 of IP-km accessible	Good	Population Profile/BPJ	75% of IP-Km to 90% of IP-km
Winter Rearing Juveniles	Riparian Vegetation	Tree Diameter (North of SF Bay)	NA	0	Population Profile/BPJ	55 - 69% Class 5 & 6 across IP-km
Winter Rearing Juveniles	Riparian Vegetation	Tree Diameter (South of SF Bay)	≥80% Density rating "D" across IP-km	Good	SEC Analysis/CDFG Data	≥80% Density rating "D" across IP-km
Winter Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	22% streams 23% IP-km (>50% stream average scores of 1 & 2)	Poor	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2)
Winter Rearing Juveniles	Velocity Refuge	Floodplain Connectivity	50-80% Response Reach Connectivity	Fair	SEC Analysis/CDFG Data	>80% Response Reach Connectivity
Winter Rearing Juveniles	Water Quality	Toxicity	Sublethal or Chronic	Fair	NMFS Watershed Characterization	No Acute or Chronic
Winter Rearing Juveniles	Water Quality	Turbidity	<50% of streams/ IP-km maintains severity score of 3 or lower	Poor	NMFS Watershed Characterization	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower

Smolts	Estuary/Lagoon	Quality & Extent	Properly Functioning Condition	Good	SEC Analysis/CDFG Data	Properly Functioning Condition
Smolts	Habitat Complexity	Shelter Rating	0% of streams/ IP-km (>80 stream average)	Poor	Population Profile	75% to 90% of streams/ IP-Km (>80 stream average)
Smolts	Hydrology	Number, Condition and/or Magnitude of Diversions	10.38 Diversions/10 IP-km	Poor	Population Profile	0.01 - 1 Diversions/10 IP km
Smolts	Hydrology	Passage Flows	Risk Factor Score =83	Poor	TRT Spence (2008)	NMFS Flow Protocol: Risk Factor Score 35-50
Smolts	Passage/Migration	Passage at Mouth or Confluence	50% of IP-km to 74% of IP-km accessible	Fair	TRT Spence (2008)	75% of IP-Km to 90% of IP-km
Smolts	Smoltification	Temperature	>90% IP-km (>6 and <16 C)	Very Good	TRT Spence (2008)	75-90% IP-Km (>6 and <16 C)
Smolts	Water Quality	Toxicity	Sublethal or Chronic	Fair	TRT Spence (2008)	No Acute or Chronic
Smolts	Water Quality	Turbidity	<50% of streams/ IP-km maintains severity score of 3 or lower	Poor	EPA/RWQCB/NMFS Criteria	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower
Smolts	Viability	Abundance	Abundance leading to high risk spawner density =0	Poor	Newcombe and Jensen 2003	Smolt abundance to produce low risk spawner density per Spence (2008)
Watershed Processes	Hydrology	Impervious Surfaces	0.28% of Watershed in Impervious Surfaces	Very Good	SEC Analysis	3-6% of Watershed in Impervious Surfaces
Watershed Processes	Landscape Patterns	Agriculture	0.71% of Watershed in Agriculture	Very Good	EPA/RWQCB/NMFS Criteria	10-19% of Watershed in Agriculture
Watershed Processes	Landscape Patterns	Timber Harvest	<15% of Watershed in Timber Harvest	Very Good	Newcombe and Jensen 2003	25-15% of Watershed in Timber Harvest
Watershed Processes	Landscape Patterns	Urbanization	6% of watershed >1 unit/20 acres	Very Good	EPA/RWQCB/NMFS Criteria	8-11% of watershed >1 unit/20 acres
Watershed Processes	Riparian Vegetation	Species Composition	51-74% Historical Species Composition	Good	Newcombe and Jensen 2003	51-74% Intact Historical Species Composition
Watershed Processes	Sediment Transport	Road Density	3 Miles/Square Mile	Poor	EPA/RWQCB/NMFS Criteria	1.6 to 2.4 Miles/Square Mile
Watershed Processes	Sediment Transport	Streamside Road Density (100 m)	3.2 Miles/Square Mile	Poor	Newcombe and Jensen 2003	0.1 to 0.4 Miles/Square Mile

Table 2: CAP Threats Results

Threats Across Targets		Adults	Eggs	Summer Rearing Juveniles	Winter Rearing Juveniles	Smolts	Watershed Processes	Overall Threat Rank
Project-specific threats		1	2	3	4	5	6	
1	Agriculture	Medium	Medium	High	High	Medium	Medium	High
2	Channel Modification	Medium	Medium	High	High	Medium	Medium	High
3	Disease, Predation and Competition	High	-	Medium	Medium	Medium	Medium	Medium
4	Fire, Fuel Management and Fire Suppression	High	Medium	High	High	Medium	Medium	High
5	Fishing and Collecting	Medium	-	Medium	-	Medium	-	Medium
6	Hatcheries and Aquaculture	-	-	-	-	-	-	-
7	Livestock Farming and Ranching	Low	Low	Medium	Medium	Low	Low	Medium
8	Logging and Wood Harvesting	Medium	Medium	Medium	Medium	Medium	Medium	Medium
9	Mining	-	-	-	-	-	-	-
10	Recreational Areas and Activities	Medium	Medium	Medium	Medium	Low	Medium	Medium
11	Residential and Commercial Development	High	High	Very High	Very High	High	Medium	Very High
12	Roads and Railroads	High	High	Very High	High	Medium	High	Very High
13	Severe Weather Patterns	High	Medium	Very High	High	Medium	Very High	Very High
14	Water Diversion and Impoundments	High	Medium	Very High	High	High	Very High	Very High
Threat Status for Targets and Project		Very High	High	Very High	Very High	High	Very High	Very High

Central CA Coast Coho Salmon ~ San Gregorio Creek

ACTIONS FOR RESTORING HABITATS

1. Restoration- Estuary

1.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

1.1.1. **Recovery Action:** Increase and enhance estuarine habitat complexity features

1.1.1.1. **Action Step:** Identify key locations and install LWD structures targeting increased pool depth and shelter within the estuary.

1.1.2. **Recovery Action:** Reduce frequency of artificial breaching events

1.1.2.1. **Action Step:** Encourage State Parks to develop alternative access points to San Gregorio Beach.

1.1.2.2. **Action Step:** Implement patrols by citizens groups, State Parks staff, and law enforcement to ensure the sandbar is not breached.

1.1.2.3. **Action Step:** Post and provide financial rewards to individuals who identify persons who illegally breach the sandbar to the lagoon.

1.1.2.4. **Action Step:** Post durable and attractive interpretive signage at the beach to discourage casual breaching of the lagoon sandbar.

2. Restoration- Floodplain Connectivity

2.1. **Objective:** Improve over-winter survival by increasing the frequency and functionality of off-channel habitats.

2.1.1. **Recovery Action:** Create flood refuge habitat, such as hydrologically connected floodplains with riparian forest.

2.1.1.1. **Action Step:** Delineate and protect reaches possessing both potential winter rearing habitat and floodplain areas.

2.1.1.2. **Action Step:** Target habitat restoration and enhancement that will function between winter base flow and flood stage.

2.1.1.3. **Action Step:** Promote restoration projects designed to create or restore alcove, backchannel, ephemeral tributary, or seasonal pond habitats.

2.1.1.4. **Action Step:** Encourage establishment of conservation easements on floodplain habitat in key stream reaches.

2.1.1.5. **Action Step:** De-commission elevated road alignments through riparian zones or adjacent to stream channels which functionally limit seasonal floodplain access.

3. Restoration- Habitat Complexity

3.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range.

- 3.1.1. **Recovery Action:** Increase large wood frequency
 - 3.1.1.1. **Action Step:** Educate landowners, land managers, and County staff on the importance of LWD for recovery and re-establishment of properly functioning instream conditions.
 - 3.1.1.2. **Action Step:** Install LWD, boulders, and other instream features to increase habitat complexity and improve pool frequency and depth.
 - 3.1.1.3. **Action Step:** Encourage retention and recruitment of large woody debris for all historical salmonid rearing habitats in the San Gregorio Creek. Consult a hydrologist and qualified fisheries biologist before removing wood from streams.
 - 3.1.1.4. **Action Step:** If log jams are modified for fish passage, retain LWD for instream enhancement projects that address poor shelter rating for juveniles and smolts.
 - 3.1.1.5. **Action Step:** Encourage landowners to implement restoration projects as part of their ongoing operations in stream reaches where large woody debris is lacking.
 - 3.1.1.6. **Action Step:** Encourage San Mateo County to initiate large instream wood structure tracking in key stream reaches where unauthorized large woody material is commonly modified or removed.
 - 3.1.1.7. **Action Step:** Conduct conifer release to promote growth of larger diameter trees where appropriate.
- 3.1.2. **Recovery Action:** Improve frequency of primary pools and shelter ratings.
 - 3.1.2.1. **Action Step:** Promote growth of larger diameter trees where appropriate.
 - 3.1.2.2. **Action Step:** Maintain current LWD, boulders, and other structure providing features to maintain current stream complexity, pool frequency, and depth (CDFG 2004).

4. [Restoration- Hydrology](#)

- 4.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range
 - 4.1.1. **Recovery Action:** Improve flow conditions
 - 4.1.1.1. **Action Step:** Promote off-channel storage to reduce impacts of water diversion (e.g. storage tanks for rural residential users).
 - 4.1.1.2. **Action Step:** Promote conjunctive use of water for water projects whenever possible to maintain or restore coho salmon habitat.
 - 4.1.1.3. **Action Step:** Promote irrigation efficiency projects for agricultural practices.
 - 4.1.2. **Recovery Action:** Reduce the number, conditions, and/or magnitude of diversions
 - 4.1.2.1. **Action Step:** Provide incentives to water rights holders willing to convert some or all of their water right to instream use via petition change of use and §1707.
 - 4.1.2.2. **Action Step:** Continue to fund the maintenance and operation of the San Gregorio gauge.

- 4.1.2.3. **Action Step:** Establish a comprehensive stream flow evaluation program to determine instream flow needs for coho salmon and steelhead. Focus initial efforts in the middle reaches and lower reaches of San Gregorio Creek.
- 4.1.2.4. **Action Step:** Support SWRCB in regulating the use of streamside wells and groundwater.
- 4.1.2.5. **Action Step:** Request that SWRCB review and/or modify water use based on the needs of coho salmon and authorized diverters (CDFG 2004).

4.1.3. **Recovery Action:** Minimize redd scour

- 4.1.3.1. **Action Step:** Install properly sized large woody debris to appropriate viability table targets.

5. Restoration- Landscape Patterns

No species-specific actions were developed.

6. Restoration- Passage

No species-specific actions were developed.

7. Restoration- Pool Habitat

No species-specific actions were developed. See Habitat Complexity.

8. Restoration- Riparian

No species-specific actions were developed.

9. Restoration- Sediment

- 9.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

9.1.1. **Recovery Action:** Reduce turbidity and suspended sediment

- 9.1.1.1. **Action Step:** Encourage San Mateo to develop property easement acquisition funds and acquire grant monies to purchase eroding private properties in riparian corridors or properties subject to frequent flooding through a buyout program.

- 9.1.1.2. **Action Step:** Identify and repair bank failures or landslide toes that are a significant source of chronic fine sediment loads into the San Gregorio Creek.

9.1.2. **Recovery Action:** Improve instream gravel quality

- 9.1.2.1. **Action Step:** Locations for sediment catchment basins should be identified, developed and maintained, where appropriate.

- 9.1.2.2. **Action Step:** Establish and/or maintain continuous native riparian buffers.

- 9.1.2.3. **Action Step:** Work with landowners to assess the effectiveness of erosion control measures throughout the winter period.

- 9.1.2.4. **Action Step:** Permitting agencies (State, Federal, and local) should evaluate all authorized erosion control measures during the winter period.

- 9.1.2.5. **Action Step:** Solicit cooperation from NRCS, RCDs, Farm Bureau, and others to devise incentive programs and incentive-based approaches to encourage and support landowners who conduct operations in a manner compatible with CCC coho salmon recovery priorities.

10. Restoration- Viability

- 10.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

- 10.1.1. **Recovery Action:** Increase abundance

10.1.1.1. **Action Step:** Work with existing permittees to rescue juvenile coho salmon that are under an imminent risk of stranding and mortality and relocate to suitable habitat when deemed appropriate by NMFS and CDFG.

10.1.1.2. **Action Step:** Re-establish a naturally reproducing run of coho salmon in appropriate subwatersheds. Prioritize Core and Phase 1 watersheds.

- 10.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

- 10.2.1. **Recovery Action:** Increase spatial structure and diversity

10.2.1.1. **Action Step:** Encourage a watershed-wide HCP for all or multiple landowners within a watershed to pool resources as a means to facilitate the long-term survival and recovery for coho salmon and their habitat.

- 10.2.2. **Recovery Action:** Refine assessment methods to more accurately identify and measure key habitat attributes.

10.2.2.1. **Action Step:** Implement a monitoring program to evaluate the performance of recovery efforts. Core areas should have the highest priority for a site-based assessment; adapt the strategies for restoration and threat abatement to address site-based issues identified by the watershed assessments.

- 10.2.3. **Recovery Action:** Increase spawner density

10.2.3.1. **Action Step:** Conduct periodic, standardized spawning surveys to estimate adult abundance in the watershed. Surveys should include all three cohorts.

- 10.3. **Objective:** Address other natural or manmade factors affecting the species' continued existence

- 10.3.1. **Recovery Action:** Increase spawner density

10.3.1.1. **Action Step:** Establish release imprinting stations, and other smolt release streams, so that smolts can be held for a minimum two week period prior to release. The holding period should allow for imprinting to occur on the parent release stream, increasing the potential for returns as adults which spawn naturally.

- 10.3.2. **Recovery Action:** Measure or estimate the condition of key attributes across the watershed.

10.3.2.1. **Action Step:** Develop standardized watershed assessments within sub-watersheds to define limiting factors specific to those areas. Encourage all major landowners to develop similar assessment methods.

10.3.2.2. **Action Step:** Monitor population status for response to recovery actions.

11. Restoration- Water Quality

11.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

11.1.1. **Recovery Action:** Reduce toxicity and pollutants

11.1.1.1. **Action Step:** Native vegetation and xeric landscaping should be considered in all locations to reduce the need for watering and application of herbicides, pesticides, and fertilizers.

11.1.2. **Recovery Action:** Evaluate point and non-point sources contributing to poor water quality, including sources contributing debris, pesticides, and sediment (turbidity); develop and implement a plan to address these sources.

11.1.2.1. **Action Step:** Evaluate water quality below likely sources of contamination.

11.1.2.2. **Action Step:** Coordinate with local law enforcement agencies to post reward for information leading to the identification and conviction of entities disposing of toxic chemicals into watercourses.

11.1.3. **Recovery Action:** Reduce turbidity and suspended sediment

11.1.3.1. **Action Step:** Disperse discharge from new or upgraded commercial and residential areas into a spatially distributed network rather than a few point discharges, which can result in locally severe erosion and disruption of riparian vegetation and instream habitat.

11.1.3.2. **Action Step:** Implement education programs and modify policies and procedures to improve riparian corridor protection, maintain channel integrity, implement alternatives to hard bank protection, and retain large woody debris.

11.1.3.3. **Action Step:** Encourage San Mateo County to establish wider riparian buffers in residential and urban areas.

11.1.3.4. **Action Step:** Implement Best Management Practices such as those in the Fish Friendly Farming program (California Land Stewardship Institute), or other cooperative conservation programs.

THREAT ABATEMENT ACTIONS

12. Threat- Agricultural Practices

12.1. **Objective:** Address the present or threatened destruction, modification or curtailment of the species habitat or range

12.1.1. **Recovery Action:** Prevent impairment to floodplain connectivity

12.1.1.1. **Action Step:** Maintain properly functioning conditions, and do not allow further degradation, of floodplain extent and connectivity.

13. Threat- Channel Modification

13.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

13.1.1. **Recovery Action:** Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)

13.1.1.1. **Action Step:** Eliminate the use of gabion baskets and undersized rock within the bankfull channel.

13.1.1.2. **Action Step:** Evaluate whether proposed stabilization projects will lead to additional instability either up- or downstream.

13.1.1.3. **Action Step:** Thoroughly investigate the ultimate cause of channel instability prior to engaging in site specific channel modifications and maintenance. Identify and target remediation of watershed process disruption as an overall priority.

13.1.2. **Recovery Action:** Prevent impairment to instream habitat complexity

13.1.2.1. **Action Step:** Where riprap and other bank hardening is necessary, integrate other habitat-forming features – including large woody debris and riparian plantings and other methodologies to minimize habitat alteration effects.

13.1.3. **Recovery Action:** Prevent impairment to floodplain connectivity (impaired quality & extent)

13.1.3.1. **Action Step:** Remove or modify structures impairing or reducing the historical feeding and salt water transition habit where feasible and benefits to rearing coho and/or the estuarine environment are predicted. Evaluate benefits to lagoon tidal prism with modification of culvert identified in Stillwater Sciences et al. (2010) upstream of the Highway 1 Bridge.

13.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

13.2.1. **Recovery Action:** Prevent impairment to floodplain connectivity (impaired quality & extent)

13.2.1.1. **Action Step:** Modify county regulatory and planning processes to eliminate provisions allowing new construction of permanent infrastructure that will adversely affect watershed processes, particularly within the 100-year flood prone zones in all historical CCC coho salmon watersheds.

14. Threat- Disease/Predation/Competition

14.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range.

14.1.1. **Recovery Action:** Prevent adverse alterations to riparian species composition and structure

14.1.1.1. **Action Step:** Improve conditions for salmonids by decreasing the adverse effects of exotic vegetation within the stream and riparian corridor.

14.2. **Objective:** Address disease or predation

14.2.1. **Recovery Action:** Prevent reduced density, abundance, and diversity

- 14.2.1.1. **Action Step:** Evaluate impacts of striped bass predation in coastal estuaries to juvenile and smolting salmonids and implement abatement strategies where appropriate.

15. [Threat- Fire/Fuel Management](#)

- 15.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

- 15.1.1. **Recovery Action:** Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)

- 15.1.1.1. **Action Step:** Implement sedimentation reduction techniques in concert with prescribed fire techniques to minimize sediment impacts to various coho salmon life stages.

- 15.1.1.2. **Action Step:** Immediately implement appropriate sediment control measures following completion of fire suppression while firefighters and equipment are on site.

- 15.1.1.3. **Action Step:** Reduce erosion from fire prevention or suppression activities by maintaining existing natural topography to the extent possible.

- 15.1.1.4. **Action Step:** Re-contour any new facility sites as soon as possible after site cleanup and fire.

- 15.1.1.5. **Action Step:** Encourage CalFire to provide plan to all non-County firefighters when providing firefighting assistance in the watershed (and all other watersheds in the County).

- 15.1.2. **Recovery Action:** Prevent increased landscape disturbance

- 15.1.2.1. **Action Step:** Work with County planners to define future impacts of proposed urban and infrastructure development on fire suppression and fuel load buildup.

- 15.1.2.2. **Action Step:** In the event of a wildfire, we recommend CalFire Resource Advisors contact the resource agencies for ESA consultation (or technical assistance) regarding the incident. The resource agencies can provide guidance regarding critical resources in the area that may be affected by firefighting actions.

- 15.1.3. **Recovery Action:** Prevent impairment to stream hydrology (impaired water flow)

- 15.1.3.1. **Action Step:** Draft water from lakes and reservoirs not occupied by listed salmonids when possible. In fish-bearing streams, excavate active channel areas outside of wetted width to create off-stream pools for water source.

- 15.2. **Objective:** Address the inadequacies of regulatory mechanisms.

- 15.2.1. **Recovery Action:** Prevent impairment to water quality

- 15.2.1.1. **Action Step:** Disseminate NMFS' October 9, 2007, jeopardy biological opinion on the use of fire retardants to local firefighting agencies and CalFire.

16. [Threat- Fishing/Collecting](#)

No species-specific actions were developed.

17. [Threat- Hatcheries](#)

No species-specific actions were developed.

18. Threat- Livestock

No species-specific actions were developed.

19. Threat- Logging

No species-specific actions were developed.

20. Threat- Mining

No species-specific actions were developed.

21. Threat- Recreation

No species-specific actions were developed.

22. Threat- Residential/Commercial Development

22.1. **Objective:** Address the present or threatened destruction, modification or curtailment of the species habitat or range

22.1.1. **Recovery Action:** Prevent impairment to stream hydrology (impaired water flow)

22.1.1.1. **Action Step:** New development in all historical CCC coho salmon watersheds should meet a zero net increase in storm-water runoff, changes in duration, or magnitude of peak flow.

22.1.2. **Recovery Action:** Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)

22.1.2.1. **Action Step:** Design new developments to avoid unstable slopes, wetlands, areas of high habitat value, and similarly constrained sites that occur adjacent to a CCC coho salmon watercourse.

22.1.2.2. **Action Step:** Maintain intact and properly functioning riparian buffers to filter and prevent fine sediment input from entering streams.

22.1.2.3. **Action Step:** Rate of sediment input from existing and future commercial development should be reduced to magnitudes appropriate to the geological setting of the watershed, resulting in no net increase in sedimentation over natural limits.

22.1.3. **Recovery Action:** Prevent impairment to floodplain connectivity (impaired quality & extent)

22.1.3.1. **Action Step:** Design new development to allow streams to meander in historical patterns.

22.1.3.2. **Action Step:** Encourage County planning departments to designate special assessment districts for properties with infrastructure located in high risk flood prone zones. Revenue generated should be used to raise or relocate infrastructure away from high risk flood zones.

22.1.3.3. **Action Step:** Evaluate watershed for infrastructure at high risk of flooding.

22.1.4. **Recovery Action:** Prevent increased landscape disturbance

22.1.4.1. **Action Step:** Promote infill and high density developments over dispersal of low density rural residential in undeveloped areas.

22.1.4.2. **Action Step:** Identify areas at high risk of conversion, and develop incentives and alternatives for landowners that discourage conversion.

22.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

22.2.1. **Recovery Action:** Prevent adverse alterations to riparian species composition and structure

22.2.1.1. **Action Step:** Encourage County and local municipalities to expand riparian buffer widths for existing development and enforce existing regulations.

22.2.2. **Recovery Action:** Prevent impairment to water quality

22.2.2.1. **Action Step:** Avoid, or at a minimum regulate, the use of commercial and industrial products (e.g. pesticides) with high potential for contamination of local waterways.

22.2.2.2. **Action Step:** Encourage increased oversight by appropriate regulatory agencies of activities that use hazardous commercial and industrial products in the watershed.

22.2.3. **Recovery Action:** Prevent impairment to watershed hydrology

22.2.3.1. **Action Step:** Implement ordinances and policies such that new developments meet a zero net increase in storm water runoff, changes in duration, or magnitude of peak flow.

22.2.4. **Recovery Action:** Prevent increased landscape disturbance

22.2.4.1. **Action Step:** Standards and recommendations regarding development should apply to all jurisdictions, including school districts and other special districts not subject to county and/or state related ordinances or policies.

22.2.4.2. **Action Step:** Discourage San Mateo County from rezoning forestlands to rural residential.

22.2.4.3. **Action Step:** Discourage home building or other incompatible land use in areas identified as timber production zones (TPZ).

22.2.5. **Recovery Action:** Prevent impairment to floodplain connectivity (impaired quality & extent)

22.2.5.1. **Action Step:** County should adopt a policy of “managed retreat” (removal of problematic infrastructure and replacement with native vegetation or flood tolerant land uses) for areas highly susceptible to, or previously damaged from, flooding.

23. [Threat- Roads/Railroads](#)

23.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

23.1.1. **Recovery Action:** Prevent impairment to watershed hydrology

23.1.1.1. **Action Step:** Size culverts to accommodate flashy, debris-laden flows and maintain trash racks to prevent culvert plugging and subsequent road failure.

23.1.1.2. **Action Step:** Develop a private road database using standardized methods. The methods should document all road features, apply erosion rates, and compile information into a GIS database.

23.1.1.3. **Action Step:** Reduce road densities by 10 percent over the next 20 years, prioritizing high risk areas in historical habitats or Core CCC coho salmon watersheds.

- 23.1.2. **Recovery Action:** Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)
- 23.1.2.1. **Action Step:** Use available best management practices for road construction, maintenance, management and decommissioning (e.g. Weaver and Hagans, 1994; Sommarstrom et al., 2002; Oregon Department of Transportation, 1999).
- 23.1.2.2. **Action Step:** Conduct road and sediment reduction assessments to identify sediment-related and runoff-related problems and determine level of hydrologic connectivity.
- 23.1.2.3. **Action Step:** Evaluate stream crossings for their potential to impair natural geomorphic processes. Replace or retrofit crossings to achieve more natural conditions that meet sediment transport goals.
- 23.1.2.4. **Action Step:** Establish adequate spoils storage sites throughout the watershed so that material from landslides and road maintenance can be stored safely away from coho streams. Coordinate these efforts with all landowners in the watershed, CalTrans, and county road maintenance staff as appropriate.
- 23.1.2.5. **Action Step:** Evaluate and remove roadside berms that lead to increased runoff velocities and result in increased sediment discharge.
- 23.1.2.6. **Action Step:** Install and maintain adequate energy dissipaters for culverts and other drainage pipe outlets where needed.
- 23.1.2.7. **Action Step:** Conduct outreach and education regarding the adverse effects of roads, and the types of best management practices protective of salmonids.
- 23.1.2.8. **Action Step:** Install sediment traps for pretreatment, and a modified culvert system that can act as an efficient detention system.
- 23.1.2.9. **Action Step:** Develop a road upgrade fund to supplement FEMA emergency repair funding so problem roads could be upgraded to reduce sediment loading and improve road reliability. Seek amendment of FEMA policies to allow improvements that prevent erosion and failure, particularly in watersheds with endangered salmonid habitat.
- 23.1.2.10. **Action Step:** Encourage County to continue implementation of the San Mateo County Road Maintenance Manual.
- 23.1.3. **Recovery Action:** Prevent impairment to passage and migration
- 23.1.3.1. **Action Step:** Bridges associated with new roads or replacement bridges (including railroad bridges) should be free span or constructed with the minimum number of bents feasible in order to minimize drift accumulation and facilitate fish passage.
- 23.1.4. **Recovery Action:** Prevent adverse alterations to riparian species composition and structure
- 23.1.4.1. **Action Step:** Discourage or eliminate unwanted vegetation and promote desirable (native) vegetation.

23.1.4.2. **Action Step:** Encourage adoption and implementation of a plan similar to the County of Santa Cruz's Integrated Vegetation Management Plan for Roads Near Perennial Waters (URS Corporation, 2008) regarding roadside maintenance activities. This plan was developed to discourage or eliminate unwanted vegetation and promote desirable (native) vegetation.

23.2. **Objective:** Address the inadequacy of existing regulatory mechanisms

23.2.1. **Recovery Action:** Address sediment and runoff sources from road networks and other actions that deliver sediment and runoff to stream channels.

23.2.1.1. **Action Step:** Encourage County of San Mateo to increase enforcement of existing County regulations regarding grading, riparian and building violations, and sediment release from county roads.

23.2.2. **Recovery Action:** Prevent impairment to floodplain connectivity (impaired quality & extent)

23.2.2.1. **Action Step:** Protect channel migration zones and their riparian areas by designing new roads to allow streams to meander in historical patterns.

23.2.3. **Recovery Action:** Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)

23.2.3.1. **Action Step:** Conduct annual inspections of all roads prior to winter. Correct conditions that are likely to deliver sediment to streams.

23.2.3.2. **Action Step:** For all rural (unpaved) and seasonal dirt roads apply (at a minimum) the road standards outlined in the California Forest Practice Rules.

23.2.3.3. **Action Step:** Limit winter use of unsurfaced roads and recreational trails by unauthorized and impacting uses to decrease fine sediment loads.

24. Threat- Severe Weather Patterns

24.1. **Objective:** Address the present or threatened destruction, modification, or curtailment of the species habitat or range

24.1.1. **Recovery Action:** Prevent impairment to the estuary (impaired quality and extent)

24.1.1.1. **Action Step:** Design projects to include subtidal habitats and natural bioengineering techniques that buffer wave action and increase sediment deposition to minimize shoreline and wetland erosion (California State Coastal Conservancy et al. 2010).

24.1.1.2. **Action Step:** Monitor and evaluate existing subtidal resources and habitat types to track impacts of sea level rise to subtidal habitats that occur within and adjacent to selected tidal wetland restoration projects (California State Coastal Conservancy et al. 2010).

24.1.1.3. **Action Step:** Evaluate living shoreline and associated techniques as a way to benefit habitats while providing desired shoreline stabilization needs for future shoreline restoration or shoreline protection structures (California State Coastal Conservancy et al. 2010). Implement where feasible. See California State Coastal Conservancy et al. (2010) for

habitat types to consider for inclusion, recommended monitoring, and potentially suitable locations for implementation.

24.1.2. **Recovery Action:** Prevent impairment to stream hydrology (impaired water flow)

24.1.2.1. **Action Step:** Develop and implement critical flow levels for stream reaches impacted by water diversions during drought conditions.

24.1.2.2. **Action Step:** Ensure all diversions in the watershed are in compliance with all applicable laws and policies during drought periods.

24.1.2.3. **Action Step:** If predicted flows are below a level considered critical to maintain viable rearing habitat for salmonids, measures to reduce water consumption should be initiated through conservation programs.

24.1.3. **Recovery Action:** Prevent impairment to water quality

24.1.3.1. **Action Step:** Implement performance standards in Stormwater Management Plans.

24.1.3.2. **Action Step:** Ensure tolerable water temperatures are maintained during drought periods.

24.1.4. **Recovery Action:** Prevent impairment to passage and migration

24.1.4.1. **Action Step:** Increase enforcement patrols by CDFG and NMFS OLE in sensitive spawning and rearing areas.

24.1.5. **Recovery Action:** Prevent impairment to floodplain connectivity (impaired quality & extent)

24.1.5.1. **Action Step:** Develop floodplain protection guidelines for use by private and public entities specific to geological and hydrological constraints.

24.1.5.2. **Action Step:** Design new development to allow streams to meander in historical patterns, Protecting riparian zones and their floodplains or channel migration zones averts the need for bank erosion control in most situations.

24.1.5.3. **Action Step:** Existing areas with floodplains or off channel habitats should be protected from future urban development of any kind.

24.1.5.4. **Action Step:** Flood control projects or other modifications facilitating new development (as opposed to protecting existing infrastructure) should be avoided.

24.1.6. **Recovery Action:** Reduce turbidity and suspended sediment

24.1.6.1. **Action Step:** Develop Bank Stabilization and Floodplain Guidelines for use by private and public entities specific to geological constraints in San Mateo County.

24.1.6.2. **Action Step:** Patterns of water runoff, including surface and subsurface drainage, should match, to the greatest extent possible, the natural hydrologic pattern for the watershed in timing, quantity, and quality.

24.1.6.3. **Action Step:** Work with local governments to incorporate protection of CCC coho salmon in any flood management activity (CDFG 2004).

25. Threat- Water Diversion/Impoundment

25.1. **Objective:** Address the present or threatened destruction, modification or curtailment of the species habitat or range

25.1.1. **Recovery Action:** Prevent impairment to the estuary (impaired quality and extent)

25.1.1.1. **Action Step:** Ensure current and future water diversions (surface and groundwater) do not further impair estuary water quality conditions for rearing juvenile salmonids.

25.1.2. **Recovery Action:** Prevent impairment to stream hydrology (impaired water flow)

25.1.2.1. **Action Step:** Ensure water supply demands can be met without impacting flow either directly or indirectly through groundwater withdrawals and aquifer depletion.

25.1.2.2. **Action Step:** Monitor, identify problems, and prioritize needed changes to water diversion on current or potential coho streams that go dry in some years (CDFG 2004).

25.1.2.3. **Action Step:** Enforce stream flow bypass requirements for all authorized diversions in San Gregorio Creek and its tributaries.

25.1.2.4. **Action Step:** Promote passive diversion devices designed to allow diversion of water only when minimum streamflow requirements are met or exceeded (CDFG 2004).

25.1.3. **Recovery Action:** Prevent impairment to passage and migration

25.1.3.1. **Action Step:** Ensure current and future water diversions (surface or groundwater) do not impair migration patterns for listed salmonids in San Gregorio Creek.

25.1.3.2. **Action Step:** Adequately screen water diversions to prevent juvenile salmonid mortalities.

25.1.4. **Recovery Action:** Prevent impairment to water quality (impaired instream temperature)

25.1.4.1. **Action Step:** Ensure water diversions do not impair water temperatures in the San Gregorio Creek.

25.2. **Objective:** Address the inadequacy of existing regulatory mechanisms.

25.2.1. **Recovery Action:** Prevent impairment to stream hydrology (impaired water flow)

25.2.1.1. **Action Step:** Evaluate and monitor 1600 program compliance related to all water diversions (CDFG 2004).

25.2.1.2. **Action Step:** Identify and work with the SWRCB to eliminate depletion of summer base flows from unauthorized water uses. Coordinated efforts by Federal and State, and County law enforcement agencies to remove illegal diversions from streams.

25.2.1.3. **Action Step:** Request the SWRCB conduct interagency consultation with the California Department of Fish and Game, and seek technical assistance from NMFS on the issuance of water rights permits.

25.2.1.4. **Action Step:** Support SWRCB in regulating the use of streamside wells and groundwater.

26. Threat- Watershed Process

No species-specific actions were developed.

Table 3: Implementation Schedule ~ San Gregorio Creek

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-1.1	Objective	Estuary	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-1.1.1	Recovery Action	Estuary	Increase and enhance estuarine habitat complexity features										
SGC-CCC-1.1.1.1	Action Step	Estuary	Identify key locations and install LWD structures targeting increased pool depth and shelter within the estuary.	3	15	CA Coastal Commission, California Coastal Conservancy, CDFG, IWRP, San Mateo RCD, State Parks	13.67	13.67	13.67			41	Improving quantity of structures should be targeted at providing improved residual depth during low tide in spring for smolt transition and feeding. Cost to treat 1 acre (assume 1 project/acre in 5% of total estuarine habitat) at a rate of \$41,092/acre.
SGC-CCC-1.1.2	Recovery Action	Estuary	Reduce frequency of artificial breaching events										
SGC-CCC-1.1.2.1	Action Step	Estuary	Encourage State Parks to develop alternative access points to San Gregorio Beach.	2	5	State Parks						In-Kind	In some years, beach goers cannot access the beach without entering the lagoon. This may encourage illegal breaching. An alternative access point may minimize motivation to breach the sandbar.
SGC-CCC-1.1.2.2	Action Step	Estuary	Implement patrols by citizens groups, State Parks staff, and law enforcement to ensure the sandbar is not breached.	2	100	CDFG Law Enforcement, NMFS OLE, Public, State Parks						In-Kind	The majority of this responsibility should belong to State Park who manage San Gregorio beach and the associated parking lot. State Parks staff working at San Gregorio beach should be encouraged to monitor the lagoon throughout the summer and fall sandbar closure period on a regular basis. Other methods should also be evaluated such as installation of cameras that provide real time oversight to ensure the sandbar is closely monitored during periods when patrols are not occurring.
SGC-CCC-1.1.2.3	Action Step	Estuary	Post and provide financial rewards to individuals who identify persons who illegally breach the sandbar to the lagoon.	2	100	CDFG Law Enforcement, NMFS OLE, State Parks						TBD	Financial rewards may act as a deterrent to those involved in unauthorized breaching of the lagoon. Breaching is believed to result in significant adverse impacts to salmonids and tidewater goby rearing in the lagoon.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-1.1.2.4	Action Step	Estuary	Post durable and attractive interpretive signage at the beach to discourage casual breaching of the lagoon sandbar.	2	10	State Parks	1.50	1.50				3	Signs should convey messages in multiple languages and cite relevant regulations that prohibit breaching activities. Signs should be placed in multiple locations across the sandbar and not just in a kiosk. Signs should be placed on the sandbar within one day of closure and remain in place throughout the critical summer and fall periods. Signs should not be removed until the lagoon has breached on its own and will likely remain open for the duration of the winter period. Cost for signs vary widely depending on content and materials. Assume \$1,000/sign for a minimum of 3 signs.
SGC-CCC-2.1	Objective	Floodplain Connectivity	Improve over-winter survival by increasing the frequency and functionality of off-channel habitats.										
SGC-CCC-2.1.1	Recovery Action	Floodplain Connectivity	Create flood refuge habitat, such as hydrologically connected floodplains with riparian forest.										
SGC-CCC-2.1.1.1	Action Step	Floodplain Connectivity	Delineate and protect reaches possessing both potential winter rearing habitat and floodplain areas.	2	10	California Coastal Conservancy, CDFG, Private Consultants, San Mateo County	117.50	117.50				235	Significant work has occurred in recent years in San Gregorio Creek and total costs could be reduced by leveraging existing information. Cost for wetland monitoring estimated at \$235,402/project.
SGC-CCC-2.1.1.2	Action Step	Floodplain Connectivity	Target habitat restoration and enhancement that will function between winter base flow and flood stage.	2	100	California Coastal Conservancy, CDFG, IWRP, NMFS, Private Consultants, Private Landowners						TBD	Costs cannot be determined at this time. Implementation will depend on landowner participation.
SGC-CCC-2.1.1.3	Action Step	Floodplain Connectivity	Promote restoration projects designed to create or restore alcove, backchannel, ephemeral tributary, or seasonal pond habitats.	1	100	California Coastal Conservancy, CDFG, IWRP, NMFS, NOAA RC, San Mateo County, San Mateo RCD, USACE						TBD	Costs will vary depending on restoration action and total number of projects implemented.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-2.1.1.4	Action Step	Floodplain Connectivity	Encourage establishment of conservation easements on floodplain habitat in key stream reaches.	2	100	FEMA, MROSD, POST, Private Landowners, San Mateo County						TBD	A lack of available winter refuge habitat, due in part to lack of access to inundated floodplain or off-channel habitats, has been identified as a limiting factor for coho salmon in the watershed according to Stillwater Sciences et al. (2010). According to Stillwater Sciences et al. (2010), the lower mainstem San Gregorio Creek historically may have been a relatively unconfined, low gradient channel, with low terraces and floodplains providing refuge habitat for salmonids during high flows. Mainstem channel and low gradient tributary reaches should be assessed to target opportunities to restore floodplain connectivity. Cost are dependent upon market value and landowner participation.
SGC-CCC-2.1.1.5	Action Step	Floodplain Connectivity	De-commission elevated road alignments through riparian zones or adjacent to stream channels which functionally limit seasonal floodplain access.	2	5	CalTrans, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County	140.00					140	Cost based on decommissioning 10 miles of riparian road network (assume 25% of riparian roads) at a rate of \$13,680/mile.
SGC-CCC-3.1	Objective	Habitat Complexity	Address the present or threatened destruction, modification, or curtailment of the species habitat or range.										
SGC-CCC-3.1.1	Recovery Action	Habitat Complexity	Increase large wood frequency										
SGC-CCC-3.1.1.1	Action Step	Habitat Complexity	Educate landowners, land managers, and County staff on the importance of LWD for recovery and re-establishment of properly functioning instream conditions.	1	50	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE						In-Kind	Program should initially be directed at landowners along important stream reaches where large wood removal has been identified as an ongoing concern by the resource agencies and the County of San Mateo.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-3.1.1.2	Action Step	Habitat Complexity	Install LWD, boulders, and other instream features to increase habitat complexity and improve pool frequency and depth.	2	10	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE	145.00	145.00				290	This is a high priority for the San Gregorio watershed. Overall costs may be reduced by assessing and leveraging past surveys and ongoing assessment in the watershed to prioritize key areas. However, due to the urbanized nature of the watershed (particularly adjacent to riparian areas) and flooding concerns, it is anticipated that most LWD structures will require engineering. Cost based on treating 10 miles of stream (assume 1 project/mile in 50% High IP) at a rate of \$28,500/mile. If ELJ used instead, cost estimated to be \$1,152,768.
SGC-CCC-3.1.1.3	Action Step	Habitat Complexity	Encourage retention and recruitment of large woody debris for all historical salmonid rearing habitats in the San Gregorio Creek. Consult a hydrologist and qualified fisheries biologist before removing wood from streams.	1	100	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE						In-Kind	Manipulation of LWD should not occur until evaluated by the San Mateo County Planning staff and hydrologist and/or qualified biologist familiar with Central Coast streams. LWD target could likely be achieved in a relatively short time period of existing and newly recruited large wood was left intact by landowners. Cost savings would be significant. Currently a significant amount of large woody material was removed without proper authorization in the watershed.
						CDFG, Mid Peninsula Open Space District,							Retention of wood could result in cost savings for future restoration projects. Significant oversight and evaluation should occur prior to removal of any large wood structure. Winter habitat has been degraded for salmonids in part from a lack of LWD, which provides important slow-water refuge areas during high flow events (Stillwater Sciences et al. 2010). Coho salmon summer habitat has also been degraded by the lack of LWD, which helps to form pools where salmonids can over-summer, and provides cover and protection from predators. Winter habitat has been degraded for both coho salmon and steelhead and Winter habitat LWD enhancement projects should be implemented and designed to provide continuous velocity refuges for juvenile salmonids from winter baseflows and floods, while summer habitat LWD projects should be implemented and designed to provide cover, and facilitate scour

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-3.1.1.4	Action Step	Habitat Complexity	If log jams are modified for fish passage, retain LWD for instream enhancement projects that address poor shelter rating for juveniles and smolts.	2	50	MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE						In-Kind	during high flows to increase pool volume and frequency. Both single log and multiple log configurations can be used depending on site-specific conditions. Naturally occurring LWD should be left in place unless it can be demonstrated to threaten adjacent infrastructure.
SGC-CCC-3.1.1.5	Action Step	Habitat Complexity	Encourage landowners to implement restoration projects as part of their ongoing operations in stream reaches where large woody debris is lacking.	3	100	CDFG, IWRP, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE						In-Kind	Cost should be minimal. This recommendation should be adopted as a reoccurring recommendation for all restoration projects by individuals, agencies, and organizations that fund restoration projects. CDFG stream surveys indicate a lack of LWD within the San Gregorio Creek watershed where all but one stream ranked as "poor". Low LWD abundance within San Gregorio Creek is likely the result of past logging practices that removed trees from riparian areas and stream clearance efforts. The lack of LWD likely is the major contributor to the lower shelter values estimated in the watershed (an average rating of 0 out of a possible total of shelter rating of 300). Reduced large wood and shelter adversely affect the summer, winter, and smolt life stages in San Gregorio Creek.
SGC-CCC-3.1.1.6	Action Step	Habitat Complexity	Encourage San Mateo County to initiate large instream wood structure tracking in key stream reaches where unauthorized large woody material is commonly modified or removed.	2	10	San Mateo County	20.00	20.00				40	Tracking efforts will provide greater certainty to regulatory agencies and land owners in regard to potential threats and benefits posed by instream woody debris. Additional funding for staff will likely be necessary to implement this recommendation.
SGC-CCC-3.1.1.7	Action Step	Habitat Complexity	Conduct conifer release to promote growth of larger diameter trees where appropriate.	3	10	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE	3.85	3.85				8	Conifer release must take a comprehensive approach and should only be initiated in stream reaches with adequate canopy cover and where increases in instream temperatures are unlikely or insignificant to downstream reaches. Conifer release will ultimately promote the natural recruitment of large wood into the tributaries and mainstem areas. Cost based on treating 5 miles (assume 80 acres/mile in 25% High IP) at a rate of \$1,621.
SGC-CCC-3.1.2	Recovery Action	Habitat Complexity	Improve frequency of primary pools and shelter ratings.										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-3.1.2.1	Action Step	Habitat Complexity	Promote growth of larger diameter trees where appropriate.	3	100								
SGC-CCC-3.1.2.2	Action Step	Habitat Complexity	Maintain current LWD, boulders, and other structure providing features to maintain current stream complexity, pool frequency, and depth (CDFG 2004).	1	100	CDFG, Santa Cruz County, USACE						In-Kind	
SGC-CCC-4.1	Objective	Hydrology	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-4.1.1	Recovery Action	Hydrology	Improve flow conditions										
SGC-CCC-4.1.1.1	Action Step	Hydrology	Promote off-channel storage to reduce impacts of water diversion (e.g. storage tanks for rural residential users).	2	20	CDFG, Farm Bureau, IWRP, Mid Peninsula Open Space District, NRCS, POST, Private Landowners, San Mateo County, San Mateo RCD, SWRCB, Trout Unlimited						In-Kind	Promoting these type of projects will require a sustained effort to target willing landowners in critical stream reaches. Incentive programs could result in rapid acceptance of these types of water conservation programs. This recommendation (which will include transfer or modification of water rights in some circumstances) should be incorporated into all future regulatory reviews of water rights applications and 1600 Agreements in the San Gregorio watershed. Infrastructure will likely consist of off stream storage facilities that are used to store winter flows. These devices in over allocated watersheds, must be carefully evaluated before installation. Due to the significant amount of over allocation in the watershed, the impact of off channel storage must be evaluated against potential impacts to channel forming flow events and migration requirements of adult salmonids.
SGC-CCC-4.1.1.2	Action Step	Hydrology	Promote conjunctive use of water for water projects whenever possible to maintain or restore coho salmon habitat.	2	10	CDFG, Farm Bureau, IWRP, Mid Peninsula Open Space District, NRCS, POST, Private Landowners, San Mateo County, San Mateo RCD, SWRCB, Trout Unlimited						TBD	Highlighting these issues will likely require the development of MOAs between water users. Conjunctive management of water resources, utilizing surface water and groundwater area could meet the current winter demand of the local diverters. The benefits of conjunctive use include providing a reliable supplemental supply, replenishment of depleted groundwater basins, and improvements to fisheries habitat. Cost will be dependent upon participation of stakeholders.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-4.1.1.3	Action Step	Hydrology	Promote irrigation efficiency projects for agricultural practices.	3	30	Farm Bureau, IWRP, NRCS, San Mateo RCD, Trout Unlimited							
SGC-CCC-4.1.2	Recovery Action	Hydrology	Reduce the number, conditions, and/or magnitude of diversions										
SGC-CCC-4.1.2.1	Action Step	Hydrology	Provide incentives to water rights holders willing to convert some or all of their water right to instream use via petition change of use and §1707.	1	10	CDFG, Farm Bureau, IWRP, Mid Peninsula Open Space District, NRCS, POST, Private Landowners, San Mateo County, SWRCB						TBD	Significant oversight by regulatory agencies may be required to ensure successful program implementation. Implementation and outreach is anticipated to occur over the entire 100 year recovery horizon due to the large number of diversions in the watershed. Cost are estimated for first ten years assuming successful implementation of two projects per year. Costs are estimated at \$70000 per landowner per year. Costs will vary depending on the size of the diversion and participation of diverters.
SGC-CCC-4.1.2.2	Action Step	Hydrology	Continue to fund the maintenance and operation of the San Gregorio gauge.	1	20	SWRCB, USACE, USGS	25.00	25.00	25.00	25.00		100	Cost are based on ongoing maintenance and operation expenses.
													Program can likely leverage off other assessment efforts in the San Gregorio watershed. Low instream flow in San Gregorio Creek has been identified as a factor limiting age 0+ and age 1+ steelhead abundance (and coho when present), and upstream migration of adult steelhead and coho salmon during dry years. This is not a desired condition for fish. CDFG stream surveys, other local literature, and a field survey by Stillwater Sciences et al. (2010) noted dry stream reaches in the late summer and fall in some years. Dry reaches restrict availability and access to riffle and deep-pool rearing habitats. By summer, particularly in dry years, flows in many portions of San Gregorio Creek are extremely low, decreasing access and contributing to loss of habitat during the rearing period. When low flows restrict the amount of area for rearing, competition for food

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-4.1.2.3	Action Step	Hydrology	Establish a comprehensive stream flow evaluation program to determine instream flow needs for coho salmon and steelhead. Focus initial efforts in the middle reaches and lower reaches of San Gregorio Creek.	2	10	CDFG, IWRP, Private Consultants, Private Landowners, San Mateo County, SWRCB, Trout Unlimited	36.00	36.00				72	and space is increased in the remaining habitat. Low flows can also decrease invertebrate production in riffles (Harvey et al., 2006). Therefore growth rates, in particular, could be reduced by low flow summer conditions (i.e., reduced food supply, increased density in pools), especially if water temperatures are increased as a result of decreased flows. Significant monitoring efforts are currently occurring in the San Gregorio watershed. Data from this monitoring effort should be evaluated and incorporated into the stream flow evaluation program as a means to reduce overall costs. However, due to the large amount of water diverted and the poor condition of the fishery it is likely an IFIM study will be needed that focuses on necessary instream flows in multiple streams and stream reaches in San Gregorio. Particular focus of this effort should be directed at stream reaches with high IP values and significant diversions. San Gregorio is most heavily over allocated streams in the San Cruz Mountains. Evaluation should also account for freshwater input into the lagoon. Cost based on stream flow model at a cost of \$71,825.
SGC-CCC-4.1.2.4	Action Step	Hydrology	Support SWRCB in regulating the use of streamside wells and groundwater.	1	100	CDFG, NMFS, NMFS OLE, Public, SWRCB, Trout Unlimited						In-Kind	
SGC-CCC-4.1.2.5	Action Step	Hydrology	Request that SWRCB review and/or modify water use based on the needs of coho salmon and authorized diverters (CDFG 2004).	1	100	CDFG, NMFS, Private Landowners, Public, SWRCB						In-Kind	Cost to promote SWRCB review existing diversions will likely vary between depending on the cooperation of the diverter.
SGC-CCC-4.1.3	Recovery Action	Hydrology	Minimize redd scour										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Comments	
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		Entire Duration
SGC-CCC-4.1.3.1	Action Step	Hydrology	Install properly sized large woody debris to appropriate viability table targets.	1	5		749					749	Redd scour is likely a limiting factor in some reaches of San Gregorio Creek, particularly during high flow events. Portions of the stream bed are prone to scour; in some areas, the existing geology contributes finer (sandy) sediments that are more prone to mobilization during higher flow events than stream reaches with well sorted stream gravels. Reduced instream habitat complexity (i.e., a lack of LWD that helps hold gravels in place), increases the likelihood of redd scour during high flow events. It was not known if scour is widespread or whether it is a significant cause of coho egg and alevin mortality. Cost based on \$115,276/mile of Engineered Log Jam for 6.5 miles of high IP. If placement of LWD used in replacement of Engineered Log Jam, cost would equal \$182,250 for treating 6.5 miles of high IP. Co-related to habitat complexity.
SGC-CCC-9.1	Objective	Sediment	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-9.1.1	Recovery Action	Sediment	Reduce turbidity and suspended sediment										Turbidity data (NHI, 2010) indicated elevated levels during the winter and spring following seasonal rainfall events. Elevated turbidity levels could injure gills, reduce feeding efficiency and adversely affect growth. Increased rates of turbidity and temperature are likely the result of land and water management practices in the watershed. Winter rearing juveniles are the primary life-stage affected by high turbidity levels.
SGC-CCC-9.1.1.1	Action Step	Sediment	Encourage San Mateo to develop property easement acquisition funds and acquire grant monies to purchase eroding private properties in riparian corridors or properties subject to frequent flooding through a buyout program.	2	100	Private Landowners, San Mateo County						TBD	Cost are dependent on market value and property turnover.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-9.1.1.2	Action Step	Sediment	Identify and repair bank failures or landslide toes that are a significant source of chronic fine sediment loads into the San Gregorio Creek.	3	100	CDFG, IWRP, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE						TBD	Extent of bank failures are unknown. Repairs should be completed using bioengineering techniques and material, where appropriate. Habitat enhancement should be incorporated into the engineering design, where appropriate. The San Gregorio Creek Watershed Information Center includes six detailed and relatively recent inventories of bank erosion, landslide, and road-related fine sediment supply areas located primarily on Mid-peninsula Open Regional Open Space District and San Mateo County properties. In addition, the San Mateo County RCD is conducting additional assessments and geospatial analysis of roads in the watershed as part of its Rural Roads Program. Implementing the high priority recommendations for treatment in these inventories is a logical and cost-effective way to remediate known sources of fine sediment.
SGC-CCC-9.1.2	Recovery Action	Sediment	Improve instream gravel quality										
SGC-CCC-9.1.2.1	Action Step	Sediment	Locations for sediment catchment basins should be identified, developed and maintained, where appropriate.	3	100	CalTrans, Mid Peninsula Open Space District, NRCS, POST, RWQCB, San Mateo County, State Parks						TBD	Sediment basins must be maintained on a yearly basis. A limited number of areas may be suitable for sediment catchment basins, but where feasible, they should be used to retain and remove potentially chronic fine sediment sources that impact primary stream channels. Sites should be located on smaller tributaries or first order streams.
SGC-CCC-9.1.2.2	Action Step	Sediment	Establish and/or maintain continuous native riparian buffers.	3	100	CalFire, CalTrans, Mid Peninsula Open Space District, NRCS, Pescadero Municipal Advisory Council, Private Landowners, RWQCB, San Mateo County, State Parks, USACE						TBD	In a study on the San Lorenzo River in Santa Cruz County, Balance Hydrologics found stream reaches with a total of 1.5 to 2 bankfull widths (on both banks) of healthy native riparian vegetation offer the best instream habitat and have the most stable banks (Balance Hydrologics 1998). These riparian width recommendations are also appropriate for San Gregorio and would facilitate return of watershed processes to properly functioning conditions.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-9.1.2.3	Action Step	Sediment	Work with landowners to assess the effectiveness of erosion control measures throughout the winter period.	3	100	Farm Bureau, NRCS, RWQCB, San Mateo County, San Mateo RCD						In-Kind	Excessive sediment transport rates in the San Gregorio watershed have compromised spawning and rearing habitat. Pool filling appears to result from upslope erosion, and has been noted to reduce available habitat throughout the San Gregorio Creek watershed since the 1970s (Titus et al., 2010).
SGC-CCC-9.1.2.4	Action Step	Sediment	Permitting agencies (State, Federal, and local) should evaluate all authorized erosion control measures during the winter period.	3	100	CalFire, CDFG, FEMA, NMFS PRD, NRCS, RWQCB, San Mateo County, USACE, USFWS						In-Kind	While costs are involved in this recommendation, inspections should be considered a standard business practice by all regulatory agencies and this action should not be considered as an additional cost.
SGC-CCC-9.1.2.5	Action Step	Sediment	Solicit cooperation from NRCS, RCDs, Farm Bureau, and others to devise incentive programs and incentive-based approaches to encourage and support landowners who conduct operations in a manner compatible with CCC coho salmon recovery priorities.	3	10	CDFG, Farm Bureau, NRCS, Private Landowners, San Mateo RCD						In-Kind	Evaluate and adopt programs such as the Fish Friendly Farming Program.
SGC-CCC-10.1	Objective	Viability	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-10.1.1	Recovery Action	Viability	Increase abundance										
SGC-CCC-10.1.1.1	Action Step	Viability	Work with existing permittees to rescue juvenile coho salmon that are under an imminent risk of stranding and mortality and relocate to suitable habitat when deemed appropriate by NMFS and CDFG.	3	100	CDFG, NOAA SWFSC, Private Consultants, Private Landowners, San Mateo RCD						In-Kind	
SGC-CCC-10.1.1.2	Action Step	Viability	Re-establish a naturally reproducing run of coho salmon in appropriate subwatersheds. Prioritize Core and Phase 1 watersheds.	2	10	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE						TBD	Re-introduction should only occur in subwatersheds where instream habitat conditions are suitable for all coho salmon lifestages. Conditions evaluated should include summer flow conditions, cover, winter refugia, pools depths, instream temperature, and gravel quality.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-10.2	Objective	Viability	Address the inadequacy of existing regulatory mechanisms										
SGC-CCC-10.2.1	Recovery Action	Viability	Increase spatial structure and diversity										
SGC-CCC-10.2.1.1	Action Step	Viability	Encourage a watershed-wide HCP for all or multiple landowners within a watershed to pool resources as a means to facilitate the long-term survival and recovery for coho salmon and their habitat.	3	10	CalTrans, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County, San Mateo RCD, State Parks	400.00	400.00				800	If existing information is adequate regarding watershed conditions for covered species, it is possible to reduce overall costs considerably. However, if HCP negotiations are contentious and protracted, costs could increase considerably.
SGC-CCC-10.2.2	Recovery Action	Viability	Refine assessment methods to more accurately identify and measure key habitat attributes.										
SGC-CCC-10.2.2.1	Action Step	Viability	Implement a monitoring program to evaluate the performance of recovery efforts. Core areas should have the highest priority for a site-based assessment; adapt the strategies for restoration and threat abatement to address site-based issues identified by the watershed assessments.	2	10	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE	41.00	41.00				82	Cost based on riparian restoration at a cost of \$81,437.
SGC-CCC-10.2.3	Recovery Action	Viability	Increase spawner density										
SGC-CCC-10.2.3.1	Action Step	Viability	Conduct periodic, standardized spawning surveys to estimate adult abundance in the watershed. Surveys should include all three cohorts.	3	20	CDFG, Mid Peninsula Open Space District, MROSD, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks	14.25	14.25	14.25	14.25		57	Standardized surveys should occur when a small sustained run of CCC coho salmon is re-established in the watershed. Other monitoring efforts are occurring in the Santa Cruz Mtns Diversity Stratum and therefore, San Gregorio ranks lower in overall priority in the immediate future. Redd monitoring using (GTRS sampling design) may be less expensive than establishing life cycle station to count migrating adults and smolts. All assessments should use standardized methods. Methods should be consistent across the ESU, or at a minimum, the Santa Cruz Mountains Diversity Stratum. Cost based on annual ground survey cost for Santa Cruz Mtns.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-10.3	Objective	Viability	Address other natural or manmade factors affecting the species' continued existence										
SGC-CCC-10.3.1	Recovery Action	Viability	Increase spawner density										
SGC-CCC-10.3.1.1	Action Step	Viability	Establish release imprinting stations, and other smolt release streams, so that smolts can be held for a minimum two week period prior to release. The holding period should allow for imprinting to occur on the parent release stream, increasing the potential for returns as adults which spawn naturally.	3	10	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE							Imprinting stations will increase the likelihood of adults returning and re-establish a run in targeted sub basins. A total of two to three imprinting station may be needed in various tributaries of San Gregorio Creek. Stations should continue until a run is verifiably re-established. Suitable locations should be carefully evaluated for their potential to support a viable run.
SGC-CCC-10.3.2	Recovery Action	Viability	Measure or estimate the condition of key attributes across the watershed.										
SGC-CCC-10.3.2.1	Action Step	Viability	Develop standardized watershed assessments within sub-watersheds to define limiting factors specific to those areas. Encourage all major landowners to develop similar assessment methods.	2	15	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE						TBD	All assessments should use standardized methods. Methods should be consistent across the CCC DPS or at a minimum the Santa Cruz Mountains Diversity Stratum. Results from past assessments can be used in some circumstances to jump start restoration actions and need not necessarily wait upon completion of a standardized assessment protocol.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-10.3.2.2	Action Step	Viability	Monitor population status for response to recovery actions.	3	10	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE	63.50	63.50				127	Primary emphasis for monitoring should be placed on adult assessments. All efforts should be closely coordinated for survey efforts within the Santa Cruz Mountains to minimize duplication and ensure consistency of results. Priority ranking may change if San Gregorio is determined to be an optimal watershed in regional sampling. Priorities for sampling should be coordinated with coho sampling efforts. While San Gregorio is considered to be an Independent population only the San Lorenzo and Pescadero are considered to have Independent populations for CCC coho salmon in the Santa Cruz Mountains Diversity Stratum. Due to this ranking, it is likely Pescadero and San Lorenzo will carry greater importance in a regional sampling effort. Cost for fish/habitat restoration effectiveness monitoring estimated at \$126,758/project.
SGC-CCC-11.1	Objective	Water Quality	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-11.1.1	Recovery Action	Water Quality	Reduce toxicity and pollutants										
SGC-CCC-11.1.1.1	Action Step	Water Quality	Native vegetation and xeric landscaping should be considered in all locations to reduce the need for watering and application of herbicides, pesticides, and fertilizers.	3	100	RWQCB, San Mateo County						In-Kind	
SGC-CCC-11.1.2	Recovery Action	Water Quality	Evaluate point and non-point sources contributing to poor water quality, including sources contributing debris, pesticides, and sediment (turbidity); develop and implement a plan to address these sources.										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-11.1.2.1	Action Step	Water Quality	Evaluate water quality below likely sources of contamination.	2	10	RWQCB, San Mateo County, USEPA	12.50	12.50				25	Sources of input may include leaky septic systems, nursery effluent, wild or domestic animals, and/or poorly managed horse and livestock facilities. The San Gregorio Creek watershed is currently listed as impaired for bacteria and sediment under Section 303(d) of the Clean Water Act (SFBRWQCB, 2006). Water temperature was considered suboptimal; temperatures thresholds for juvenile coho salmon, which are lower than those for steelhead, were exceeded at some of the sampling locations according to information presented in the San Gregorio Creek Watershed Management Plan (NHI 2010). NMFS determined setting temperature thresholds based on the more narrow range of coho salmon thermal requirements was appropriate for watersheds with co-occurring populations of CCC coho salmon and CCC steelhead. Cost for continuous water quality monitoring stations estimated at \$5,000/station. Assume minimum 5 for San Gregorio Creek. Cost does not account for maintenance or data management.
SGC-CCC-11.1.2.2	Action Step	Water Quality	Coordinate with local law enforcement agencies to post reward for information leading to the identification and conviction of entities disposing of toxic chemicals into watercourses.	2	25	County DA, Law Enforcement, Public, Sheriff Department						TBD	
SGC-CCC-11.1.3	Recovery Action	Water Quality	Reduce turbidity and suspended sediment										Water quality is impaired from land use practices in the watershed. Many landuse practices degrade water quality and coho salmon survival, principally through the input of fine sediment which results in increased turbidity, which smothers spawning gravels, reduces food production, and fills in rearing habitats. Sources of sediment input include roads and road maintenance, agriculture, residential development, and logging.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-11.1.3.1	Action Step	Water Quality	Disperse discharge from new or upgraded commercial and residential areas into a spatially distributed network rather than a few point discharges, which can result in locally severe erosion and disruption of riparian vegetation and instream habitat.	2	100	CalFire, CalTrans, Private Landowners, RWQCB, San Mateo County, USACE, USEPA						TBD	Cost to upgrade stormwater discharge points cannot be determined at this time, but it may be significant. Turbidity data (NHI, 2010) indicated elevated levels during the winter and spring following seasonal rainfall events. Elevated turbidity levels could injure gills, reduce feeding efficiency and adversely affect growth. Increased rates of turbidity and temperature are likely the result of land and water management practices in the watershed. Winter rearing juveniles are the primary life-stage affected by high turbidity levels.
SGC-CCC-11.1.3.2	Action Step	Water Quality	Implement education programs and modify policies and procedures to improve riparian corridor protection, maintain channel integrity, implement alternatives to hard bank protection, and retain large woody debris.	3	10	CalFire, Farm Bureau, NRCS, Private Landowners, RWQCB, San Mateo County, San Mateo RCD						In-Kind	
SGC-CCC-11.1.3.3	Action Step	Water Quality	Encourage San Mateo County to establish wider riparian buffers in residential and urban areas.	2	10	CDFG, NMFS, Private Landowners, RWQCB, San Mateo County, USEPA, USFWS						In-Kind	This will likely be a sensitive issue for many landowners with property located next to riparian areas. This recommendation should be applied to all new development projects.
SGC-CCC-11.1.3.4	Action Step	Water Quality	Implement Best Management Practices such as those in the Fish Friendly Farming program (California Land Stewardship Institute), or other cooperative conservation programs.	3	100	Farm Bureau, Private Landowners, San Mateo County, San Mateo RCD						In-Kind	Note that these programs and take minimization measures and are not a no take standard. The San Mateo Farm Bureau is working with landowners to voluntarily address sources of sediment contribution and the Sotoyome RCD program could be combined with this ongoing effort.
SGC-CCC-12.1	Objective	Agricultural Practices	Address the present or threatened destruction, modification or curtailment of the species habitat or range										
SGC-CCC-12.1.1	Recovery Action	Agricultural Practices	Prevent impairment to floodplain connectivity										
SGC-CCC-12.1.1.1	Action Step	Agricultural Practices	Maintain properly functioning conditions, and do not allow further degradation, of floodplain extent and connectivity.	1	100	San Mateo County						In-Kind	

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-13.1	Objective	Channel Modification	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-13.1.1	Recovery Action	Channel Modification	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										
SGC-CCC-13.1.1.1	Action Step	Channel Modification	Eliminate the use of gabion baskets and undersized rock within the bankfull channel.	2	100	California Geological Survey, CalTrans, CDFG, FEMA, RWQCB, San Mateo County						In-Kind	Eliminating gabion baskets will result in long-term cost savings due implementation of longer lasting and better engineered solutions.
SGC-CCC-13.1.1.2	Action Step	Channel Modification	Evaluate whether proposed stabilization projects will lead to additional instability either up- or downstream.	2	100	California Geological Survey, CalTrans, CDFG, FEMA, RWQCB, San Mateo County						In-Kind	This recommendation should be adopted as a standard business practice for all agencies and consulting firms involved in actions that address stream stability. Many important high IP value reaches have already been subjected to bank hardening. These areas are frequently urbanized. Future proposals in these areas should be carefully evaluated and implemented only if necessary and with compensatory mitigation.
SGC-CCC-13.1.1.3	Action Step	Channel Modification	Thoroughly investigate the ultimate cause of channel instability prior to engaging in site specific channel modifications and maintenance. Identify and target remediation of watershed process disruption as an overall priority.	2	100	California Geological Survey, CalTrans, FEMA, NRCS, Private Landowners, Public, RWQCB, San Mateo County, San Mateo RCD						In-Kind	This should become a standard business practice for all agencies and consulting firms engaged in constructing and designing solutions to address channel stability.
SGC-CCC-13.1.2	Recovery Action	Channel Modification	Prevent impairment to instream habitat complexity										
SGC-CCC-13.1.2.1	Action Step	Channel Modification	Where riprap and other bank hardening is necessary, integrate other habitat-forming features – including large woody debris and riparian plantings and other methodologies to minimize habitat alteration effects.	2	100	California Geological Survey, CalTrans, CDFG, FEMA, RWQCB, San Mateo County						In-Kind	This recommendation should be considered standard practice.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-13.1.3	Recovery Action	Channel Modification	Prevent impairment to floodplain connectivity (impaired quality & extent)										
SGC-CCC-13.1.3.1	Action Step	Channel Modification	Remove or modify structures impairing or reducing the historical feeding and salt water transition habit where feasible and benefits to rearing coho and/or the estuarine environment are predicted. Evaluate benefits to lagoon tidal prism with modification of culvert identified in Stillwater Sciences et al. (2010) upstream of the Highway 1 Bridge.	3	10	CA Coastal Commission, CalTrans, CDFG, IWRP, NMFS, San Mateo County, San Mateo RCD, State Parks, USACE, USFWS						TBD	Questions remain regarding the benefits of the action to improving conditions to the now-dewatered marsh as identified by Stillwater Sciences et al. (2010) and Smith (1987). Additional benefits may be accrued for tidewater goby and USFWS should be closely consulted. Benefits to coho may include additional winter high water refugia and additional sources of food production for salmonids rearing in the lagoon.
SGC-CCC-13.2	Objective	Channel Modification	Address the inadequacy of existing regulatory mechanisms										
SGC-CCC-13.2.1	Recovery Action	Channel Modification	Prevent impairment to floodplain connectivity (impaired quality & extent)										
SGC-CCC-13.2.1.1	Action Step	Channel Modification	Modify county regulatory and planning processes to eliminate provisions allowing new construction of permanent infrastructure that will adversely affect watershed processes, particularly within the 100-year flood prone zones in all historical CCC coho salmon watersheds.	2	100	San Mateo County						In-Kind	
SGC-CCC-14.1	Objective	Disease/Predation/Competition	Address the present or threatened destruction, modification, or curtailment of the species habitat or range.										
SGC-CCC-14.1.1	Recovery Action	Disease/Predation/Competition	Prevent adverse alterations to riparian species composition and structure										
SGC-CCC-14.1.1.1	Action Step	Disease/Predation/Competition	Improve conditions for salmonids by decreasing the adverse effects of exotic vegetation within the stream and riparian corridor.	3	20	Private Landowners, San Mateo RCD	79.00	79.00	79.00	79.00		316	Cost based on removing invasive exotic vegetation in 1 mile (assume 80 acres/mile in 5% High IP) at a rate of \$39,574/acre.
SGC-CCC-14.2	Objective	Disease/Predation/Competition	Address disease or predation										
SGC-CCC-14.2.1	Recovery Action	Disease/Predation/Competition	Prevent reduced density, abundance, and diversity										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-14.2.1.1	Action Step	Disease/Predation/Competition	Evaluate impacts of striped bass predation in coastal estuaries to juvenile and smolting salmonids and implement abatement strategies where appropriate.	3	20	CDFG, NOAA SWFSC	95.00	95.00	95.00	95.00		380	Cost based on life history/population size at a cost of \$188,264.
SGC-CCC-15.1	Objective	Fire/Fuel Management	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-15.1.1	Recovery Action	Fire/Fuel Management	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										
SGC-CCC-15.1.1.1	Action Step	Fire/Fuel Management	Implement sedimentation reduction techniques in concert with prescribed fire techniques to minimize sediment impacts to various coho salmon life stages.	2	100	CalFire						in-Kind	This recommendation should be considered a standard practice.
SGC-CCC-15.1.1.2	Action Step	Fire/Fuel Management	Immediately implement appropriate sediment control measures following completion of fire suppression while firefighters and equipment are on site.	2	100	CalFire, San Mateo County, San Mateo RCD						In-Kind	This recommendation will result in a net cost savings. This recommendation should be considered a standard practice and no additional financial costs are anticipated.
SGC-CCC-15.1.1.3	Action Step	Fire/Fuel Management	Reduce erosion from fire prevention or suppression activities by maintaining existing natural topography to the extent possible.	3	100	CalFire, San Mateo County, San Mateo RCD						In-Kind	Implementing erosion control measures when constructing firebreaks (if possible) or shortly thereafter will likely result in a net cost savings. It is much more financially efficient to implement these measures while the fire crews are present rather than months later after the fire is out. Some areas in the San Gregorio watershed have high fire hazard rating according to CalFire data. A major fire, particularly if located in areas with a high erosion hazard rating, could substantially increase fine sediment input and further compromise the rate of large wood recruitment in stream channels. Furthermore, if existing riparian areas were lost to fire, higher stream temperatures, which are already above optimal condition along the mainstem, would likely result.
SGC-CCC-15.1.1.4	Action Step	Fire/Fuel Management	Re-contour any new facility sites as soon as possible after site cleanup and fire.	3	100	CalFire						In-Kind	Standard business practice.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-15.1.1.5	Action Step	Fire/Fuel Management	Encourage CalFire to provide plan to all non-County firefighters when providing firefighting assistance in the watershed (and all other watersheds in the County).	2	100	CalFire						In-Kind	
SGC-CCC-15.1.2	Recovery Action	Fire/Fuel Management	Prevent increased landscape disturbance										
SGC-CCC-15.1.2.1	Action Step	Fire/Fuel Management	Work with County planners to define future impacts of proposed urban and infrastructure development on fire suppression and fuel load buildup.	2	50	CalFire, San Mateo County, San Mateo RCD						In-Kind	Some areas in the San Gregorio watershed have a high fire hazard rating according to CalFire data. A major fire, particularly if located in areas with a high erosion hazard rating, could substantially increase fine sediment input and further compromise the rate of large wood recruitment into stream channels. Furthermore, if existing riparian areas were lost to fire, higher instream temperatures, which are already above optimal condition along the mainstem, would likely result.
SGC-CCC-15.1.2.2	Action Step	Fire/Fuel Management	In the event of a wildfire, we recommend CalFire Resource Advisors contact the resource agencies for ESA consultation (or technical assistance) regarding the incident. The resource agencies can provide guidance regarding critical resources in the area that may be affected by firefighting actions.	2	100	CalFire, San Mateo County, San Mateo RCD						In-Kind	Guidance could include informing CalFire in regards to the presence of sensitive biological resources in the watershed as well as recommendations regarding watersource locations. Protocols, similar to those recommended here, are already in place between USFWS, NMFS, BLM, and USFS which could provide a template for CalFire.
SGC-CCC-15.1.3	Recovery Action	Fire/Fuel Management	Prevent impairment to stream hydrology (impaired water flow)										
SGC-CCC-15.1.3.1	Action Step	Fire/Fuel Management	Draft water from lakes and reservoirs not occupied by listed salmonids when possible. In fish-bearing streams, excavate active channel areas outside of wetted width to create off-stream pools for water source.	3	100	CalFire							Require all water truck/tenders be fitted with CDFG and NMFS approved fish screens when water is acquired at fish bearing streams. Put up a silt fence or other erosion controls around the water extraction locations. Attempt to avoid significantly lowering stream flows during water drafting.
SGC-CCC-15.2	Objective	Fire/Fuel Management	Address the inadequacies of regulatory mechanisms.										
SGC-CCC-15.2.1	Recovery Action	Fire/Fuel Management	Prevent impairment to water quality										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-15.2.1.1	Action Step	Fire/Fuel Management	Disseminate NMFS' October 9, 2007, jeopardy biological opinion on the use of fire retardants to local firefighting agencies and CalFire.	2	2	CalFire						0	
SGC-CCC-22.1	Objective	Residential/Commercial Development	Address the present or threatened destruction, modification or curtailment of the species habitat or range										
SGC-CCC-22.1.1	Recovery Action	Residential/Commercial Development	Prevent impairment to stream hydrology (impaired water flow)										
SGC-CCC-22.1.1.1	Action Step	Residential/Commercial Development	New development in all historical CCC coho salmon watersheds should meet a zero net increase in storm-water runoff, changes in duration, or magnitude of peak flow.	2	100	RWQCB, San Mateo County						TBD	Costs in rural areas where these storm water plans are not required may be significant on a project by project basis.
SGC-CCC-22.1.2	Recovery Action	Residential/Commercial Development	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										
SGC-CCC-22.1.2.1	Action Step	Residential/Commercial Development	Design new developments to avoid unstable slopes, wetlands, areas of high habitat value, and similarly constrained sites that occur adjacent to a CCC coho salmon watercourse.	2	100	FEMA, Private Landowners, San Mateo County						In-Kind	A shallow landslide model predicted about 4.4% of the watershed as chronic or high instability in the headwater regions of the El Corte de Madera, La Honda, and Mindego Creek sub-basins. Stringent review by permitting agencies is expected to reduce ancillary costs associated with poorly planned and poorly located developments. Priority areas that should be avoided include the estuary and geologies with steep mixed lithology and the sandstone geologies in the watershed.
SGC-CCC-22.1.2.2	Action Step	Residential/Commercial Development	Maintain intact and properly functioning riparian buffers to filter and prevent fine sediment input from entering streams.	2	100	FEMA, Private Landowners, San Mateo County							Functional buffers provide multiple benefits to water processes. Buffers in residential areas frequently become compromised overtime due to encroachment issues.
SGC-CCC-22.1.2.3	Action Step	Residential/Commercial Development	Rate of sediment input from existing and future commercial development should be reduced to magnitudes appropriate to the geological setting of the watershed, resulting in no net increase in sedimentation over natural limits.	2	100	FEMA, Private Landowners, San Mateo County						In-Kind	General recommendation that should be applied to all pre existing and future landuse activities in the watershed. This recommendation should be considered standard practice.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-22.1.3	Recovery Action	Residential/Commercial Development	Prevent impairment to floodplain connectivity (impaired quality & extent)										
SGC-CCC-22.1.3.1	Action Step	Residential/Commercial Development	Design new development to allow streams to meander in historical patterns.	1	100	FEMA, Private Landowners, San Mateo County						In-Kind	Protecting riparian zones and their floodplains or channel migration zones averts the need for bank erosion control in most situations.
SGC-CCC-22.1.3.2	Action Step	Residential/Commercial Development	Encourage County planning departments to designate special assessment districts for properties with infrastructure located in high risk flood prone zones. Revenue generated should be used to raise or relocate infrastructure away from high risk flood zones.	3	20	FEMA, Private Landowners, San Mateo County						In-Kind	Protection of floodplains is critical for juvenile salmonids, particularly during the winter high flow period. Restoration of floodplains is typically very expensive when subject to development pressures.
SGC-CCC-22.1.3.3	Action Step	Residential/Commercial Development	Evaluate watershed for infrastructure at high risk of flooding.	2	10	FEMA, Private Landowners, San Mateo County	10.00	10.00				20	Most of these structures have likely been identified. Cost associated with ground truthing and site specific evaluation.
SGC-CCC-22.1.4	Recovery Action	Residential/Commercial Development	Prevent increased landscape disturbance										
SGC-CCC-22.1.4.1	Action Step	Residential/Commercial Development	Promote infill and high density developments over dispersal of low density rural residential in undeveloped areas.	1	100	RWQCB, San Mateo County						In-Kind	This action encourages implementation of many existing policies. The 2000 census estimated the population within San Gregorio Creek at 2,458 individuals; six percent of the watershed has a housing density higher than 1 unit per 20 acres (NMFS GIS 2009), with the majority of the development located in close proximity to the various watercourses. Although the population in the watershed is relatively low compared to many other watersheds in the ESU, the proximity of residences to stream channels places riparian areas and stream channels at greater risk for future alteration.
SGC-CCC-22.1.4.2	Action Step	Residential/Commercial Development	Identify areas at high risk of conversion, and develop incentives and alternatives for landowners that discourage conversion.	1	100	County of San Mateo, Mid Peninsula Open Space District, POST						TBD	
SGC-CCC-22.2	Objective	Residential/Commercial Development	Address the inadequacy of existing regulatory mechanisms										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-22.2.1	Recovery Action	Residential/Commercial Development	Prevent adverse alterations to riparian species composition and structure										
SGC-CCC-22.2.1.1	Action Step	Residential/Commercial Development	Encourage County and local municipalities to expand riparian buffer widths for existing development and enforce existing regulations.	3	5	Public, RWQCB, San Mateo County						In-Kind	San Mateo County should develop incentives for landowners to facilitate an effective riparian zone of vegetation adjacent to stream banks to become established. Initial efforts should be directed at key tributaries vs. mainstem.
SGC-CCC-22.2.2	Recovery Action	Residential/Commercial Development	Prevent impairment to water quality										
SGC-CCC-22.2.2.1	Action Step	Residential/Commercial Development	Avoid, or at a minimum regulate, the use of commercial and industrial products (e.g. pesticides) with high potential for contamination of local waterways.	3	100	Public, RWQCB, San Mateo County						In-Kind	Costs should be minimal and are considered part of RWQCB existing authority and obligation.
SGC-CCC-22.2.2.2	Action Step	Residential/Commercial Development	Encourage increased oversight by appropriate regulatory agencies of activities that use hazardous commercial and industrial products in the watershed.	3	100	RWQCB, San Mateo County, USEPA						In-Kind	
SGC-CCC-22.2.3	Recovery Action	Residential/Commercial Development	Prevent impairment to watershed hydrology										
SGC-CCC-22.2.3.1	Action Step	Residential/Commercial Development	Implement ordinances and policies such that new developments meet a zero net increase in storm water runoff, changes in duration, or magnitude of peak flow.	3	10	CDFG, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC, State Parks, USACE						In-Kind	
SGC-CCC-22.2.4	Recovery Action	Residential/Commercial Development	Prevent increased landscape disturbance										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-22.2.4.1	Action Step	Residential/Commercial Development	Standards and recommendations regarding development should apply to all jurisdictions, including school districts and other special districts not subject to county and/or state related ordinances or policies.	3	100	San Mateo County						In-Kind	
SGC-CCC-22.2.4.2	Action Step	Residential/Commercial Development	Discourage San Mateo County from rezoning forestlands to rural residential.	1	100	San Mateo County						In-Kind	
SGC-CCC-22.2.4.3	Action Step	Residential/Commercial Development	Discourage home building or other incompatible land use in areas identified as timber production zones (TPZ).	1	100	CDFG, Mid Peninsula Open Space District, MROSD, POST, RWQCB, San Mateo County, San Mateo RCD, SGERC						In-Kind	Housing in forestlands typically leads to chronic stream degradation due to impacts to water quality, increased rates of sedimentation, future consequences of flood fighting to riparian zones and bank hardening, etc. The adverse impacts of extensive rural residential development in the San Lorenzo River watershed is reflected in high rates of sedimentation and water diversion.
SGC-CCC-22.2.5	Recovery Action	Residential/Commercial Development	Prevent impairment to floodplain connectivity (impaired quality & extent)										
SGC-CCC-22.2.5.1	Action Step	Residential/Commercial Development	County should adopt a policy of "managed retreat" (removal of problematic infrastructure and replacement with native vegetation or flood tolerant land uses) for areas highly susceptible to, or previously damaged from, flooding.	3	20	San Mateo County						TBD	Many residences and properties in the San Gregorio watershed are prone to flooding, and efforts to minimize the impacts of flooding will likely include removing instream habitat features such as wood debris (a practice that has occurred in the past). Residences located adjacent to stream channels are often at increased risk of bank erosion, and efforts to protect existing infrastructure will likely include bank stabilization efforts that could further degrade salmonid habitat.
SGC-CCC-23.1	Objective	Roads/Railroads	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-23.1.1	Recovery Action	Roads/Railroads	Prevent impairment to watershed hydrology										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-23.1.1.1	Action Step	Roads/Railroads	Size culverts to accommodate flashy, debris-laden flows and maintain trash racks to prevent culvert plugging and subsequent road failure.	2	100	CalFire, CalTrans, Private Landowners, San Mateo County						In-Kind	All new and replacement culverts should be sized to accommodate a 100 year flow event.
SGC-CCC-23.1.1.2	Action Step	Roads/Railroads	Develop a private road database using standardized methods. The methods should document all road features, apply erosion rates, and compile information into a GIS database.	3	20	CalFire, CalTrans, Private Landowners, San Mateo County	40.25	40.25	40.25	40.25		161	Cost based on inventorying 133 miles of road network at a rate of \$1,056/mile and establishing a database.
SGC-CCC-23.1.1.3	Action Step	Roads/Railroads	Reduce road densities by 10 percent over the next 20 years, prioritizing high risk areas in historical habitats or Core CCC coho salmon watersheds.	3	20	CalFire, CalTrans, Private Landowners, San Mateo County	45.00	45.00	45.00	45.00		180	This recommendation will be difficult to implement due to the extensive development in the watershed and topographical confinement. Initial roads targeted will likely be unsurfaced seasonal roads where ongoing maintenance does not comport with modern standards. Targeted areas should include sub watersheds with high erosion potential. Many of the former logging roads in the upper portion of the watershed are now used as recreational trails by mountain bikers. These trails are often very steep and contribute substantial fine sediment to San Gregorio Creek due to inadequate maintenance practices and poor trail locations (Ambrose, pers. obs. 2002). A shallow landslide model predicted about 4.4% of the watershed as chronic or high instability in the headwater regions of the El Corte de Madera, La Honda, and Mindego Creek sub-basins. Repairing and decommissioning roads in areas predicted as chronically or highly unstable could reduce the likelihood of sediment input from areas predicted as chronically or highly unstable. Indiscriminate road density reduction should be avoided so as not to preclude inhibiting future road realignments that could also effectively reduce sediment delivery. Cost based on decommissioning 13 miles of road network at a rate of \$13,690/mile.
SGC-CCC-23.1.2	Recovery Action	Roads/Railroads	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-23.1.2.1	Action Step	Roads/Railroads	Use available best management practices for road construction, maintenance, management and decommissioning (e.g. Weaver and Hagans, 1994; Sommarstrom et al., 2002; Oregon Department of Transportation, 1999).	2	100	CalFire, CalTrans, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County						In-Kind	This recommendation should be considered standard practice.
SGC-CCC-23.1.2.2	Action Step	Roads/Railroads	Conduct road and sediment reduction assessments to identify sediment-related and runoff-related problems and determine level of hydrologic connectivity.	3	10	CalFire, CalTrans, IWRP, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County, San Mateo RCD							On many forest and ranch roads, located on both public and private lands, periodic maintenance falls short of addressing chronic, localized erosion problems. In these circumstances, grading of poorly drained roads and repair of failed fills and stream crossings can continue and even exacerbate the rate of fine sediment delivery to the stream channel. Additionally, paved and unpaved roads parallel many of the waterways within San Gregorio Creek, and may impinge channel migration. Cost accounted for in RESIDENTIAL/COMMERCIAL DEVELOPMENT.
SGC-CCC-23.1.2.3	Action Step	Roads/Railroads	Evaluate stream crossings for their potential to impair natural geomorphic processes. Replace or retrofit crossings to achieve more natural conditions that meet sediment transport goals.	3	20	CalFire, CalTrans, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County	775	775	775	775		3,100	Costs associate with barrier modification must be carefully balanced against other restoration activities that are less popular socially, but may yield greater benefits to various lifestages. If bridges are not feasible, replacement culverts on fish bearing streams must have a natural bottom. Cost base on improving passage at 9 stream crossings (2 impassable, 7 temporary or partially impassable) at a rate of \$744,882 for impassable and \$254,278 for partially impassable.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-23.1.2.4	Action Step	Roads/Railroads	Establish adequate spoils storage sites throughout the watershed so that material from landslides and road maintenance can be stored safely away from coho streams. Coordinate these efforts with all landowners in the watershed, CalTrans, and county road maintenance staff as appropriate.	3	5	CalFire, CalTrans, RWQCB, San Mateo County, State Parks						TBD	Inadequate storage of sediment from road management has been an ongoing issue in San Gregorio watershed. The paucity of locations for temporary storage of landslide material is a significant constraint. Sites should be identified within the duration specified and this action should be continued in perpetuity. A significant amount of sediment is removed from inside ditches and road surfaces during winter months due to general erosion and removal of landslides and is temporarily deposited in areas with hydraulic connectivity to watercourses. Future efforts may require incentives to increase landowner participation. Cost dependent on identifying spoil storage sites and feasibility of meeting targets.
SGC-CCC-23.1.2.5	Action Step	Roads/Railroads	Evaluate and remove roadside berms that lead to increased runoff velocities and result in increased sediment discharge.	3	20	CalFire, CalTrans, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County						In-Kind	Roadside berms are common on many private and county roads in San Mateo County and result in concentrated water and sediment runoff. These features are often created to serve as a quasi safety device (in lieu of crash barriers or guard rails).
SGC-CCC-23.1.2.6	Action Step	Roads/Railroads	Install and maintain adequate energy dissipaters for culverts and other drainage pipe outlets where needed.	3	20	CalFire, CalTrans, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County, State Parks						TBD	Road inventory should identify the number and extent of energy dissipaters needed.
SGC-CCC-23.1.2.7	Action Step	Roads/Railroads	Conduct outreach and education regarding the adverse effects of roads, and the types of best management practices protective of salmonids.	2	100	CalFire, FEMA, IWRP, NRCS, Private Landowners, State Parks						In-Kind	This should be an ongoing program. Existing material can likely be used and tailored to private landowners and agencies with road maintenance staff.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-23.1.2.8	Action Step	Roads/Railroads	Install sediment traps for pretreatment, and a modified culvert system that can act as an efficient detention system.	3	100	CalFire, CalTrans, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County, State Parks						TBD	Costs will vary depending on number of culvert upgrades occur on a road network and the inefficiency of the current drainage system. Pretreatment systems should be installed as part of new projects or upgraded. A maintenance plan should be part of all pretreatment systems.
SGC-CCC-23.1.2.9	Action Step	Roads/Railroads	Develop a road upgrade fund to supplement FEMA emergency repair funding so problem roads could be upgraded to reduce sediment loading and improve road reliability. Seek amendment of FEMA policies to allow improvements that prevent erosion and failure, particularly in watersheds with endangered salmonid habitat.	3	20	CalFire, CalTrans, FEMA, Mid Peninsula Open Space District, POST, Private Landowners, San Mateo County, State Parks						TBD	Costs are difficult to accurately determine but it may result in a long term cost savings. San Mateo County should seek amendments to FEMA policies to facilitate improvements that prevent erosion and failure, particularly for watersheds targeted in this and the CCC coho salmon recovery plan.
SGC-CCC-23.1.2.10	Action Step	Roads/Railroads	Encourage County to continue implementation of the San Mateo County Road Maintenance Manual.	2	100	San Mateo County							
SGC-CCC-23.1.3	Recovery Action	Roads/Railroads	Prevent impairment to passage and migration										
SGC-CCC-23.1.3.1	Action Step	Roads/Railroads	Bridges associated with new roads or replacement bridges (including railroad bridges) should be free span or constructed with the minimum number of bents feasible in order to minimize drift accumulation and facilitate fish passage.	2	100	CalFire, CalTrans, FEMA, IWRP, NRCS, San Mateo RCD, USACE							Cost may vary significantly. In more urbanized areas costs will likely be absorbed into SWMP requirements per the RWQCB. Costs in rural areas where these storm water plans are not required may be significant on a project by project basis. Adopt NMFS (2001) Guidelines for Salmonid Passage at Stream Crossings.
SGC-CCC-23.1.4	Recovery Action	Roads/Railroads	Prevent adverse alterations to riparian species composition and structure										
SGC-CCC-23.1.4.1	Action Step	Roads/Railroads	Discourage or eliminate unwanted vegetation and promote desirable (native) vegetation.	3	100	CalFire, CalTrans, FEMA, IWRP, NRCS, Private Landowners, San Mateo County, San Mateo RCD, USACE							

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
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SGC-CCC-23.1.4.2	Action Step	Roads/Railroads	Encourage adoption and implementation of a plan similar to the County of Santa Cruz's Integrated Vegetation Management Plan for Roads Near Perennial Waters (URS Corporation, 2008) regarding roadside maintenance activities. This plan was developed to discourage or eliminate unwanted vegetation and promote desirable (native) vegetation.	2	100	CalFire, CalTrans, FEMA, IWRP, Mid Peninsula Open Space District, NRCS, POST, San Mateo County, San Mateo RCD, USACE							
SGC-CCC-23.2	Objective	Roads/Railroads	Address the inadequacy of existing regulatory mechanisms										
SGC-CCC-23.2.1	Recovery Action	Roads/Railroads	Address sediment and runoff sources from road networks and other actions that deliver sediment and runoff to stream channels.										
SGC-CCC-23.2.1.1	Action Step	Roads/Railroads	Encourage County of San Mateo to increase enforcement of existing County regulations regarding grading, riparian and building violations, and sediment release from county roads.	2	5	San Mateo County							The periodic grading and leveling of unsurfaced roads continuously exposes erodible material both on the road surface and along the road shoulders. This loose, unconsolidated material is frequently mobilized during winter storms where it enters the water column. Additionally, paved and unpaved roads parallel many of the waterways within San Gregorio Creek and impinge on channel migration. Many of these roads have areas that fail recurrently at the same unstable locations which contribute to ongoing sedimentation as well as bank hardening.
SGC-CCC-23.2.2	Recovery Action	Roads/Railroads	Prevent impairment to floodplain connectivity (impaired quality & extent)										
SGC-CCC-23.2.2.1	Action Step	Roads/Railroads	Protect channel migration zones and their riparian areas by designing new roads to allow streams to meander in historical patterns.	1	100	CalFire, CDFG, FEMA, IWRP, NMFS, NRCS, Private Landowners, RPFs, RWQCB, San Mateo County, USACE, USFWS							Preservation of remaining migration zones are a high priority due to their importance for various salmonid lifestages. Protection of these areas will potentially help facilitate future restoration actions.
SGC-CCC-23.2.3	Recovery Action	Roads/Railroads	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-23.2.3.1	Action Step	Roads/Railroads	Conduct annual inspections of all roads prior to winter. Correct conditions that are likely to deliver sediment to streams.	1	100	CalFire, CalTrans, CDFG, Mid Peninsula Open Space District, NMFS, POST, Private Landowners, RPFs, RWQCB, San Mateo County							Standard business practice; however, implementation may be difficult in the watershed due to the large number of small landowners and varying degree of financial resources. County of San Mateo evaluated roads and trails and likely have a good idea of priority locations that should be addressed on an annual basis. Rural roads should receive the majority of the attention vs. mainline roads in the watershed.
SGC-CCC-23.2.3.2	Action Step	Roads/Railroads	For all rural (unpaved) and seasonal dirt roads apply (at a minimum) the road standards outlined in the California Forest Practice Rules.	2	100	CalFire, Mid Peninsula Open Space District, NRCS, POST, Private Landowners, RPFs, RWQCB, San Mateo County							This should be considered the minimum standard for dirt roads in the watershed.
SGC-CCC-23.2.3.3	Action Step	Roads/Railroads	Limit winter use of unsurfaced roads and recreational trails by unauthorized and impacting uses to decrease fine sediment loads.	2	100	CalTrans, Mid Peninsula Open Space District, MROSD, NRCS, POST, RWQCB, San Mateo County						In-Kind	Cost should be considered part of land owner road management plans. These standards should be adopted for all unsurfaced roads and trails in the San Gregorio watershed.
SGC-CCC-24.1	Objective	Severe Weather Patterns	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SGC-CCC-24.1.1	Recovery Action	Severe Weather Patterns	Prevent impairment to the estuary (impaired quality and extent)										
SGC-CCC-24.1.1.1	Action Step	Severe Weather Patterns	Design projects to include subtidal habitats and natural bioengineering techniques that buffer wave action and increase sediment deposition to minimize shoreline and wetland erosion (California State Coastal Conservancy et al. 2010).	3	100	FEMA, State Parks, USACE							
SGC-CCC-24.1.1.2	Action Step	Severe Weather Patterns	Monitor and evaluate existing subtidal resources and habitat types to track impacts of sea level rise to subtidal habitats that occur within and adjacent to selected tidal wetland restoration projects (California State Coastal Conservancy et al. 2010).	3	10	FEMA, State Parks, USACE	156.00	156.00				312	Cost for estuary monitoring are estimated at \$311,467.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-24.1.1.3	Action Step	Severe Weather Patterns	Evaluate living shoreline and associated techniques as a way to benefit habitats while providing desired shoreline stabilization needs for future shoreline restoration or shoreline protection structures (California State Coastal Conservancy et al. 2010). Implement where feasible. See California State Coastal Conservancy et al. (2010) for habitat types to consider for inclusion, recommended monitoring, and potentially suitable locations for implementation.	3	100	FEMA, State Parks, USACE							
SGC-CCC-24.1.2	Recovery Action	Severe Weather Patterns	Prevent impairment to stream hydrology (impaired water flow)										
SGC-CCC-24.1.2.1	Action Step	Severe Weather Patterns	Develop and implement critical flow levels for stream reaches impacted by water diversions during drought conditions.	1	10	CDFG, Mid Peninsula Open Space District, NMFS, NMFS OLE, POST, Private Landowners, San Mateo RCD, SGERC, SWRCB	36.00	36.00				72	Due to the heavy overdraft of water resources from San Gregorio Creek, the impact of a severe drought could be devastating to all lifestages of coho salmon and steelhead in the watershed. Numerous diversions are located throughout the watershed in every major tributary. Although a water master is appointed, the required minimum bypass flows set by the Courts were not based on salmonid requirements. Severe drought, particularly if occurring over a period of two or more years, would likely adversely impact salmonid habitat throughout the watershed and reduce the overall carrying capacity of available habitat. Cost based on stream flow modeling at a cost of \$71,825.
SGC-CCC-24.1.2.2	Action Step	Severe Weather Patterns	Ensure all diversions in the watershed are in compliance with all applicable laws and policies during drought periods.	1	5	CDFG, NMFS, NMFS OLE, Private Landowners, SWRCB						In-Kind	The SWRCB should conduct periodic sweeps of diversions in San Gregorio Creek to ensure they are in compliance with annual reporting requirements and that annual water usage is accurately reported.
SGC-CCC-24.1.2.3	Action Step	Severe Weather Patterns	If predicted flows are below a level considered critical to maintain viable rearing habitat for salmonids, measures to reduce water consumption should be initiated through conservation programs.	2	20	CDFG, NMFS, NMFS OLE, Private Landowners, SWRCB							
SGC-CCC-24.1.3	Recovery Action	Severe Weather Patterns	Prevent impairment to water quality										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-24.1.3.1	Action Step	Severe Weather Patterns	Implement performance standards in Stormwater Management Plans.	3	30	CDFG, NMFS, NMFS OLE, Private Landowners, SWRCB						In-Kind	This recommendation should be considered standard practice.
SGC-CCC-24.1.3.2	Action Step	Severe Weather Patterns	Ensure tolerable water temperatures are maintained during drought periods.	2	5	CDFG, NMFS, NMFS OLE, Private Landowners, SGERC, SWRCB	10.00					10	Water temperatures during drought will be directly affected by ongoing surface water diversions in San Gregorio Creek and its tributaries. Concerted efforts should be made to address these diversions during drought periods to minimize predictable adverse impacts to stream temperatures. Cost based on temperature monitoring at a cost of \$10,000.
SGC-CCC-24.1.4	Recovery Action	Severe Weather Patterns	Prevent impairment to passage and migration										
SGC-CCC-24.1.4.1	Action Step	Severe Weather Patterns	Increase enforcement patrols by CDFG and NMFS OLE in sensitive spawning and rearing areas.	3	2	CDFG Law Enforcement, NMFS OLE						In-Kind	Costs are anticipated to be absorbed into ongoing activities.
SGC-CCC-24.1.5	Recovery Action	Severe Weather Patterns	Prevent impairment to floodplain connectivity (impaired quality & extent)										
SGC-CCC-24.1.5.1	Action Step	Severe Weather Patterns	Develop floodplain protection guidelines for use by private and public entities specific to geological and hydrological constraints.	3	10	CDFG, NMFS HCD, San Mateo County						In-Kind	Cost will likely consist of existing staff time. It is presumed that existing protocols could be tailor to general San Mateo County constraints. Costs may be higher if new guidelines are developed that do not rely on protocols from past studies.
SGC-CCC-24.1.5.2	Action Step	Severe Weather Patterns	Design new development to allow streams to meander in historical patterns, Protecting riparian zones and their floodplains or channel migration zones averts the need for bank erosion control in most situations.	1	100	CalTrans, FEMA, Public, San Mateo County, USACE						In-Kind	

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-24.1.5.3	Action Step	Severe Weather Patterns	Existing areas with floodplains or off channel habitats should be protected from future urban development of any kind.	1	100	CalTrans, FEMA, Public, San Mateo County, USACE						TBD	Protecting these areas from impacts of development may be costly due to concerns of reverse condemnation, etc. A lack of available winter refuge habitat, due in part to lack of access to inundated floodplain or off-channel habitats, has been identified as a limiting factor for coho salmon in the watershed according to Stillwater Sciences et al. (2010). This limiting factor for coho salmon is likely also a limiting factor for steelhead in the watershed, but to a lesser degree. According to Stillwater Sciences et al. (2010), the lower mainstem San Gregorio Creek historically may have been a relatively unconfined, low gradient channel, with low terraces and floodplains providing refuge habitat for salmonids during high flows. Mainstem channel and low gradient tributary reaches should be assessed to target opportunities to restore floodplain connectivity.
SGC-CCC-24.1.5.4	Action Step	Severe Weather Patterns	Flood control projects or other modifications facilitating new development (as opposed to protecting existing infrastructure) should be avoided.	1	100	CalTrans, FEMA, Public, San Mateo County, USACE						In-Kind	Not building flood control projects will not incur expenses. Particular attention should be directed at ensuring substantial future infrastructure is not placed within the historical tidal prism of the estuary.
SGC-CCC-24.1.6	Recovery Action	Severe Weather Patterns	Reduce turbidity and suspended sediment										
SGC-CCC-24.1.6.1	Action Step	Severe Weather Patterns	Develop Bank Stabilization and Floodplain Guidelines for use by private and public entities specific to geological constraints in San Mateo County.	2	5	CDFG, NMFS HCD, San Mateo County						In-Kind	Cost will likely consist of existing staff time. It is presumed that existing protocols could be tailor to general San Mateo County constraints.
SGC-CCC-24.1.6.2	Action Step	Severe Weather Patterns	Patterns of water runoff, including surface and subsurface drainage, should match, to the greatest extent possible, the natural hydrologic pattern for the watershed in timing, quantity, and quality.	2	100	CalTrans, FEMA, Public, San Mateo County, USACE							Extreme flood events could result in major erosion within upslope locations. Much of the watershed is comprised of erodible geology that would likely impact spawning and rearing habitats when sediment enters the stream channel. Changes and improvements in land use practices will likely lower sediment yield rates following future flooding events. However, much of the watershed is considered impaired and additional flooding events could slow the recovery rate of instream habitat conditions.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-24.1.6.3	Action Step	Severe Weather Patterns	Work with local governments to incorporate protection of CCC coho salmon in any flood management activity (CDFG 2004).	3	10	CalTrans, FEMA, Public, San Mateo County, USACE						In-Kind	Outreach and education are ongoing, and additional costs are expected to be minimal.
SGC-CCC-25.1	Objective	Water Diversion/Impoundment	Address the present or threatened destruction, modification or curtailment of the species habitat or range										
SGC-CCC-25.1.1	Recovery Action	Water Diversion/Impoundment	Prevent impairment to the estuary (impaired quality and extent)										
SGC-CCC-25.1.1.1	Action Step	Water Diversion/Impoundment	Ensure current and future water diversions (surface and groundwater) do not further impair estuary water quality conditions for rearing juvenile salmonids.	1	100	CDFG, NMFS, San Mateo County, SWRCB						In-Kind	Aquatic conditions in San Gregorio Creek are likely adversely affected by water diversions -- the watershed has been designated as a Fully Appropriated Stream by the California State Water Resources Control Board. Water diversions adversely impact the summer life stage by reducing flows and available habitat for rearing and feeding in the riverine areas as well as the estuary. Water diversions also extend the duration necessary for conversion to a freshwater lagoon during the summer.
SGC-CCC-25.1.2	Recovery Action	Water Diversion/Impoundment	Prevent impairment to stream hydrology (impaired water flow)										
													The San Gregorio watershed is adjudicated and a minimum bypass requirement of 2 cfs was established for new diversions. However, this requirement does not apply to existing water diversions, and flows are often less than 2 cfs in summer and fall (Stillwater Sciences et al. 2010). In addition, the CDFG Coho Recovery

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-25.1.2.1	Action Step	Water Diversion/Impoundment	Ensure water supply demands can be met without impacting flow either directly or indirectly through groundwater withdrawals and aquifer depletion.	1	100	CDFG, NMFS, San Mateo County, SWRCB						In-Kind	Plan (CDFG 2004) states that the prescribed bypass flows are too low to assure viable coho salmon populations. NMFS believes the concerns for coho salmon are applicable to steelhead as well, and that a minimum bypass flow of five cfs be applied to all water diversions, including existing and new wells, riparian pumping, and stream side wells. To reduce the amount of water diverted from the stream and pumped from the alluvial groundwater basin, and potentially maintain summer and fall instream flows, domestic, agricultural, and recreational water conservation strategies should be implemented (Stillwater Sciences et al.2010). Efforts to address the adverse impacts of water diversions could include increased oversight by the SWRCB (and County of San Mateo for ongoing monitoring groundwater wells) for permitted diversions, and enforcement of applicable laws for unpermitted diversions.
SGC-CCC-25.1.2.2	Action Step	Water Diversion/Impoundment	Monitor, identify problems, and prioritize needed changes to water diversion on current or potential coho streams that go dry in some years (CDFG 2004).	2	10	CDFG, Farm Bureau, NMFS, Private Landowners, San Mateo County, San Mateo RCD, SWRCB							Water diversions reduce the quantity of water in the wetted stream channel, which increases diurnal temperature fluctuations and reduces available rearing habitat. Efforts to address diversions could include increased oversight by the SWRCB for permitted diversions and enforcement of applicable laws for unpermitted diversions. Water diversions are distributed throughout the watersheds many tributaries as well as the mainstem of San Gregorio Creek. These diversions, coupled with poor instream habitat conditions, likely contribute to significant degradation of juvenile rearing opportunities during the summer period. Notable flow fluctuations are occasionally measured at the USGS San Gregorio stream gauge during low flow periods. For example, flows will drop from approximately one cfs to near zero over a period of a few hours and then return to one cfs several hours later. The cause of these fluctuations is unknown, and although specific effects on instream conditions have not been determined, they are suspected to be detrimental to fish and their habitat. The magnitude of this effect is not currently known, but during below-normal water years the available water supply can be insufficient to meet all the water rights allocated in the watershed and provide instream flows for aquatic species.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-25.1.2.3	Action Step	Water Diversion/Impoundment	Enforce stream flow bypass requirements for all authorized diversions in San Gregorio Creek and its tributaries.	1	100	CDFG, NMFS, SWRCB						In-Kind	A water master has been appointed in the San Gregorio watershed. In time, bypass requirements may change due to findings from instream flow studies.
SGC-CCC-25.1.2.4	Action Step	Water Diversion/Impoundment	Promote passive diversion devices designed to allow diversion of water only when minimum streamflow requirements are met or exceeded (CDFG 2004).	3	100	CDFG, Farm Bureau, NMFS, Private Landowners, San Mateo County, San Mateo RCD, SWRCB						In-Kind	
SGC-CCC-25.1.3	Recovery Action	Water Diversion/Impoundment	Prevent impairment to passage and migration										
SGC-CCC-25.1.3.1	Action Step	Water Diversion/Impoundment	Ensure current and future water diversions (surface or groundwater) do not impair migration patterns for listed salmonids in San Gregorio Creek.	3	100	CDFG, NMFS, Private Landowners, San Mateo County, SWRCB							
SGC-CCC-25.1.3.2	Action Step	Water Diversion/Impoundment	Adequately screen water diversions to prevent juvenile salmonid mortalities.	3	100	CDFG, NMFS, Private Landowners, SWRCB						TBD	An assessment of the number of unscreened or improperly screened diversions needs to occur first.
SGC-CCC-25.1.4	Recovery Action	Water Diversion/Impoundment	Prevent impairment to water quality (impaired instream temperature)										
SGC-CCC-25.1.4.1	Action Step	Water Diversion/Impoundment	Ensure water diversions do not impair water temperatures in the San Gregorio Creek.	2	100	CDFG, Farm Bureau, NMFS, Private Landowners, San Mateo County, San Mateo RCD, SWRCB						In-Kind	As part of future 1600 agreement, CDFG should require installation of temperature thermographs upstream and downstream of the diversion. These results should be reviewed on a yearly basis by the SWRCB and CDFG.
SGC-CCC-25.2	Objective	Water Diversion/Impoundment	Address the inadequacy of existing regulatory mechanisms.										
SGC-CCC-25.2.1	Recovery Action	Water Diversion/Impoundment	Prevent impairment to stream hydrology (impaired water flow)										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SGC-CCC-25.2.1.1	Action Step	Water Diversion/Impoundment	Evaluate and monitor 1600 program compliance related to all water diversions (CDFG 2004).	2	5	CDFG, SWRCB						In-Kind	Evaluate rates of compliance and overall impact of currently permitted diversion to coho salmon and steelhead survival and recovery. This should be adopted as a standard practice by CDFG. However, full implementation may be limited due to a lack of staffing. In this circumstance, other alternatives should be evaluated.
SGC-CCC-25.2.1.2	Action Step	Water Diversion/Impoundment	Identify and work with the SWRCB to eliminate depletion of summer base flows from unauthorized water uses. Coordinated efforts by Federal and State, and County law enforcement agencies to remove illegal diversions from streams.	1	100	SWRCB						In-Kind	Aquatic conditions in San Gregorio Creek are adversely affected by water diversions -- the watershed has been designated as a Fully Appropriated Stream by the California State Water Resources Control Board. Water management operations adversely impact almost all coho salmon (and steelhead) life-stages, particularly during drought conditions. Additionally, water diversions reduce freshwater inflow to the estuary and extend the duration necessary for conversion to a freshwater lagoon during the summer. Ensuring compliance with State Water Law will likely result in significant benefits to summer rearing conditions in the San Gregorio lagoon by improving water quality. Costs are considered minor due to appointment of a water master per the adjudication. Diversions in San Gregorio Creek and its tributaries, coupled with degraded instream habitat conditions, likely contribute to significant degradation of juvenile rearing opportunities during the summer period. To reduce the amount of water diverted from the stream and pumped from the alluvial groundwater basin, and potentially maintain summer and fall instream flows, domestic, agricultural, and recreational water conservation strategies should be implemented (Stillwater Sciences et al. 2010). Efforts to address the adverse impacts of water diversions could include increased oversight by the SWRCB (and County of San Mateo ongoing monitoring for groundwater wells) for permitted diversions, and enforcement of applicable laws for unpermitted diversions.
SGC-CCC-25.2.1.3	Action Step	Water Diversion/Impoundment	Request the SWRCB conduct interagency consultation with the California Department of Fish and Game, and seek technical assistance from NMFS on the issuance of water rights permits.	2	100	CDFG, NMFS, SWRCB						TBD	

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Comments	
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		Entire Duration
SGC-CCC-25.2.1.4	Action Step	Water Diversion/Impoundment	Support SWRCB in regulating the use of streamside wells and groundwater.	2	100	CDFG, NMFS, San Mateo County, State Parks, SWRCB, USFWS						0	The number of individual landowners in the watershed who maintain groundwater wells for residential and irrigation water supply is not known. The total number of wells in the watershed between 2006 and 2008, as contained within San Mateo County Environmental Health Division (EHD) records, was estimated at 311 (Table 2-6). The majority of these (79%) are situated in the eastern half of the watershed, which primarily acts as an area of groundwater recharge to the basin aquifer in the valley.