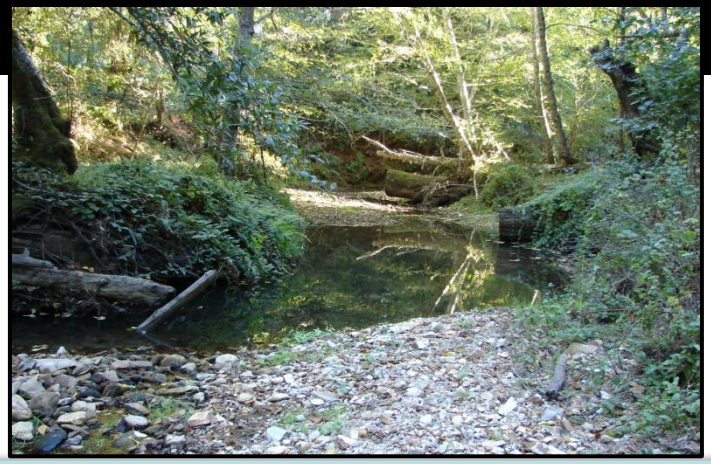
Scott(s) Creek

Location	•Santa Cruz County
Watershed Area	•30.0 Square Miles
Potential Habitat	•13.9 Stream Miles
Vegetation	•70% Coniferous, 30% Riparian or Montane Forest, or Shrubland
Erodability	•Moderate to High
Ownership Patterns	•95% Private; 5% Public
Dominant Land Uses	•Rural Residential, Timber, Agricultural
Housing Density	•Low
TMDL Pollutants	•None



Scott Creek
Photo by Jerry Smith, SJSU

Scott(s) Creek Coho Salmon: Persistent – Low Abundance

Recovery Goals

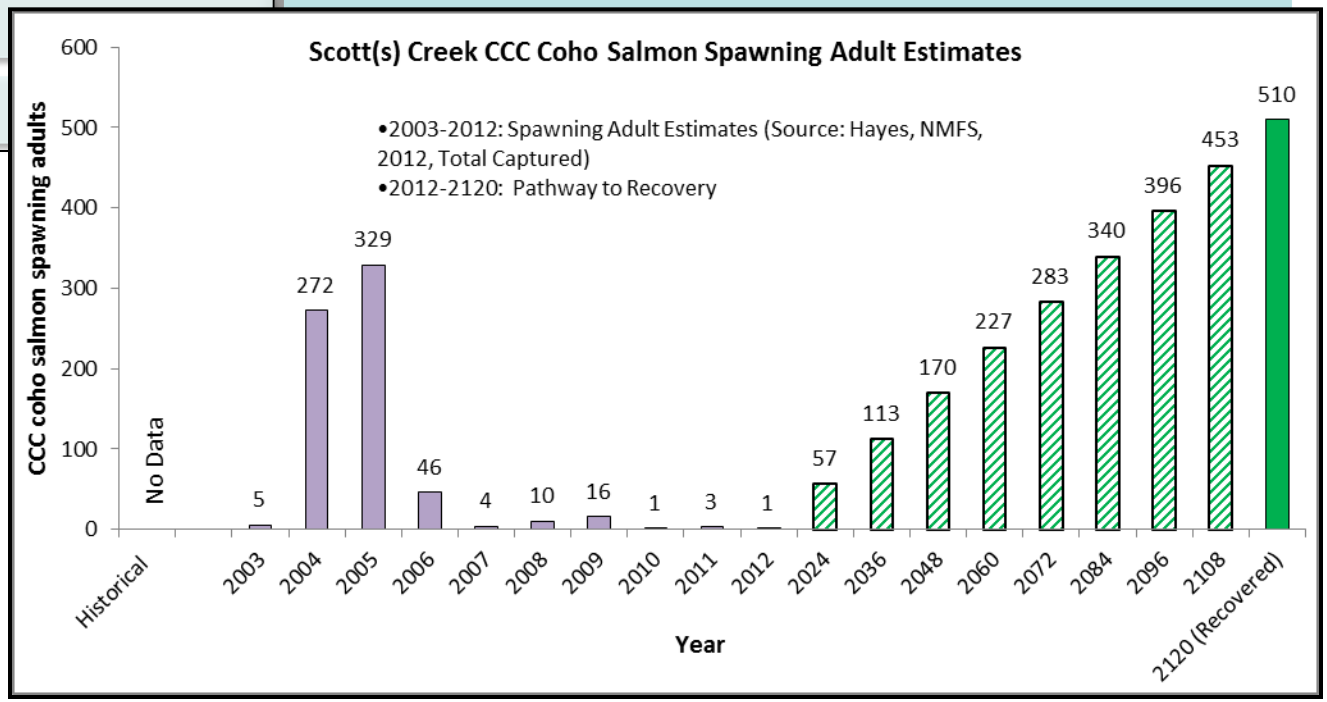
- ✓ Fund, support and expand rearing capacity at the Monterey Bay Salmon and Trout Project facility
- ✓ Continue ongoing juvenile and adult monitoring efforts in the watershed

Scott(s) Creek Adult Spawner Targets

Downlisting to Threatened
255

Recovery
510

STEELHEAD: YES
CHINOOK SALMON: NO



Scott(s) Creek

Potential Habitat: 13.9 miles
Recovery Target: 510 Spawning Adult Coho Salmon

Current Instream, Watershed and Population Conditions

Estuary/Lagoon	Habitat Complexity	Hydrology	Passage & Migration	Riparian Vegetation	Sediment	Stream Temperature	Velocity Refuge	Water Quality	Viability	Landscape Patterns
FAIR	POOR	FAIR	GOOD	FAIR	FAIR	FAIR	GOOD	FAIR	POOR	GOOD

Preventing Extinction & Improving Conditions

Priority 1: Immediate Restoration Actions

- Remove structures impairing or reducing the historical tidal prism
- Highway 1 bridge reconstruction should restore river mouth dynamics
- Encourage breeching of old levees in the lower riparian reaches
- Reclaim alcove and side channels for winter-refugia and summer rearing
- Maintain and enhance current LWD, boulders, and other structure providing features to maintain current stream complexity, pool frequency, and depth
- Provide incentives to water rights holders willing to convert some or all of their water right to instream use
- Continue funding the Scott Creek lifecycle station, and continue and expand operation of the MBSTP conservation hatchery

Priority 2 & 3: Long-Term Restoration Actions

- Restore estuarine habitat and the associated wetlands and slough
- Post interpretive signage at the beach to discourage breaching of the lagoon sandbar
- Evaluate timing and frequency of natural and artificial breeching events
- De-commission elevated road alignments through riparian zones or adjacent to stream channels which functionally limit seasonal floodplain access
- Promote off-channel storage and efficient irrigation to reduce diversion impacts
- Minimize permitting constraints for hatchery operations critical to the broodstock program

Recovery Partners

Scott Creek Watershed Counsel, CDFG

Photo courtesy from left to right: Josh Fuller, NMFS, Campbell Timberland, Campbell Timberland, City of Santa Rosa and Morgan Bond, SWFSC

Scott(s) Creek

Potential Habitat: 13.9 miles
Recovery Target: 510 Spawning Adult Coho Salmon

Future Threats

Agriculture	Channel Modification	Disease & Predation	Fire & Fuel Management	Fishing & Collecting	Hatcheries & Aquaculture	Livestock & Ranching	Logging	Mining	Recreation	Urban Development	Roads & Railroads	Severe Weather	Diversions & Impoundment
MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	MEDIUM	NA	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM

Reducing Future Threats

Priority 1: Immediate Threat Abatement Actions

- Protect existing areas providing winter refuge and seasonal habitats from channelization actions in the lower watershed
- Install salmonid identification signs at all major fishing access points
- The proposed bridge replacement for Highway 1 over Scott Creek should be relocated to allow Scott Creek to re-establish its historical outlet
- Establish and enforce minimum summer releases from the Mill Creek reservoir
- Evaluate and prepare contingency plans to breach estuary sandbars to facilitate adult upmigration when instream flows are adequate for passage and spawning

Priority 2 & 3: Long-Term Threat Abatement Actions

- Avoid lowering stream flows, entraining salmonids, or causing erosion when drafting water for dust abatement or other purposes
- Prohibit offshore salmon fishing until January 15 (or until sandbar opens naturally) within one mile of the river mouth
- Avoid or minimize impacts to off channel habitat, floodplains, ponds, and oxbows during timber harvest activities
- Retain the largest trees in all riparian zones.

Scott(s) Creek
Photo by Jerry Smith, SJSU

Conservation Highlights

- Santa Cruz RCD sediment remediation projects
- CalPoly floodplain enhancement efforts
- Monterey Bay Salmon and Trout Project broodstock program and NOAA SWFSC population estimates.

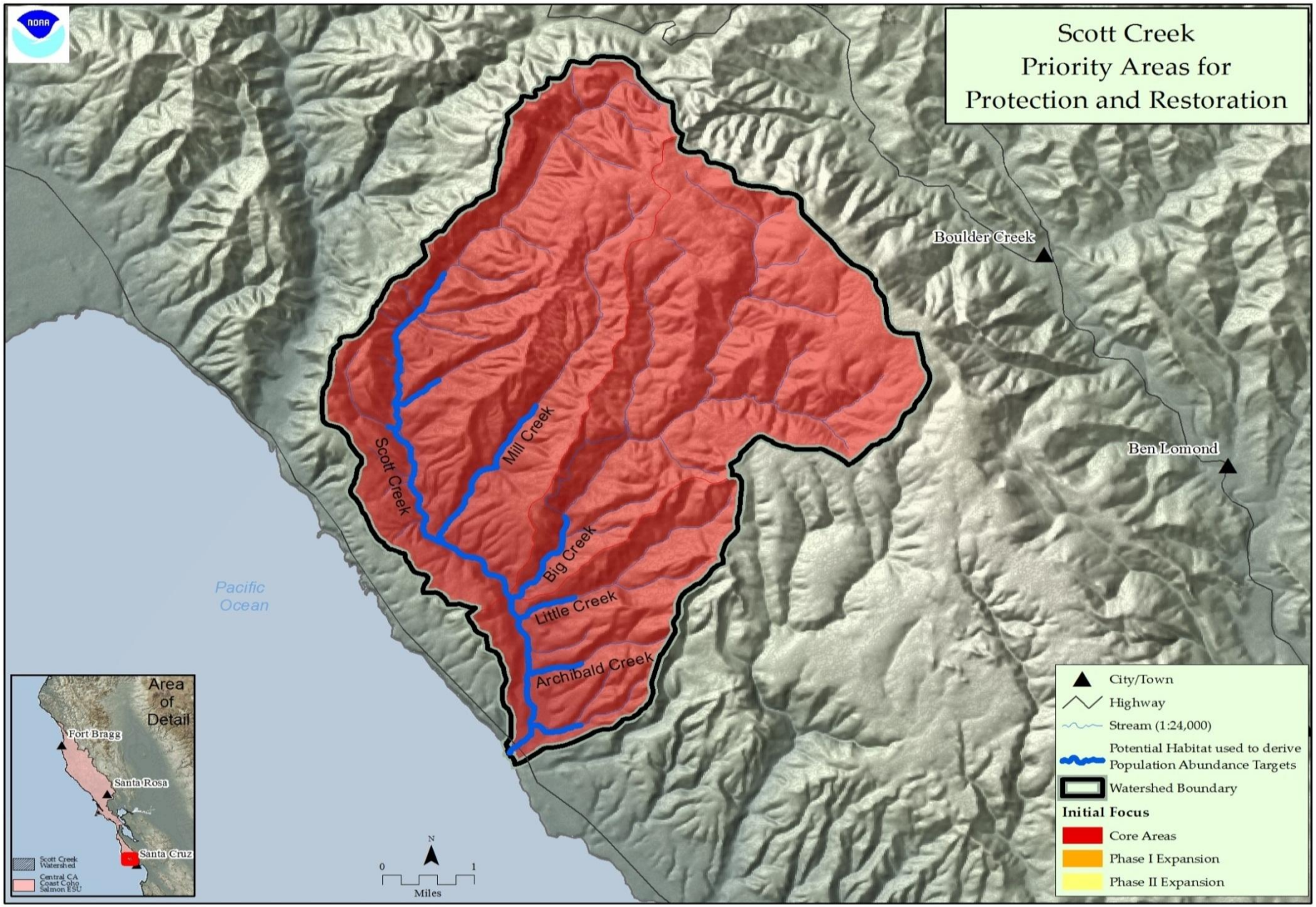


Figure 1: Map of Scott(s) Creek

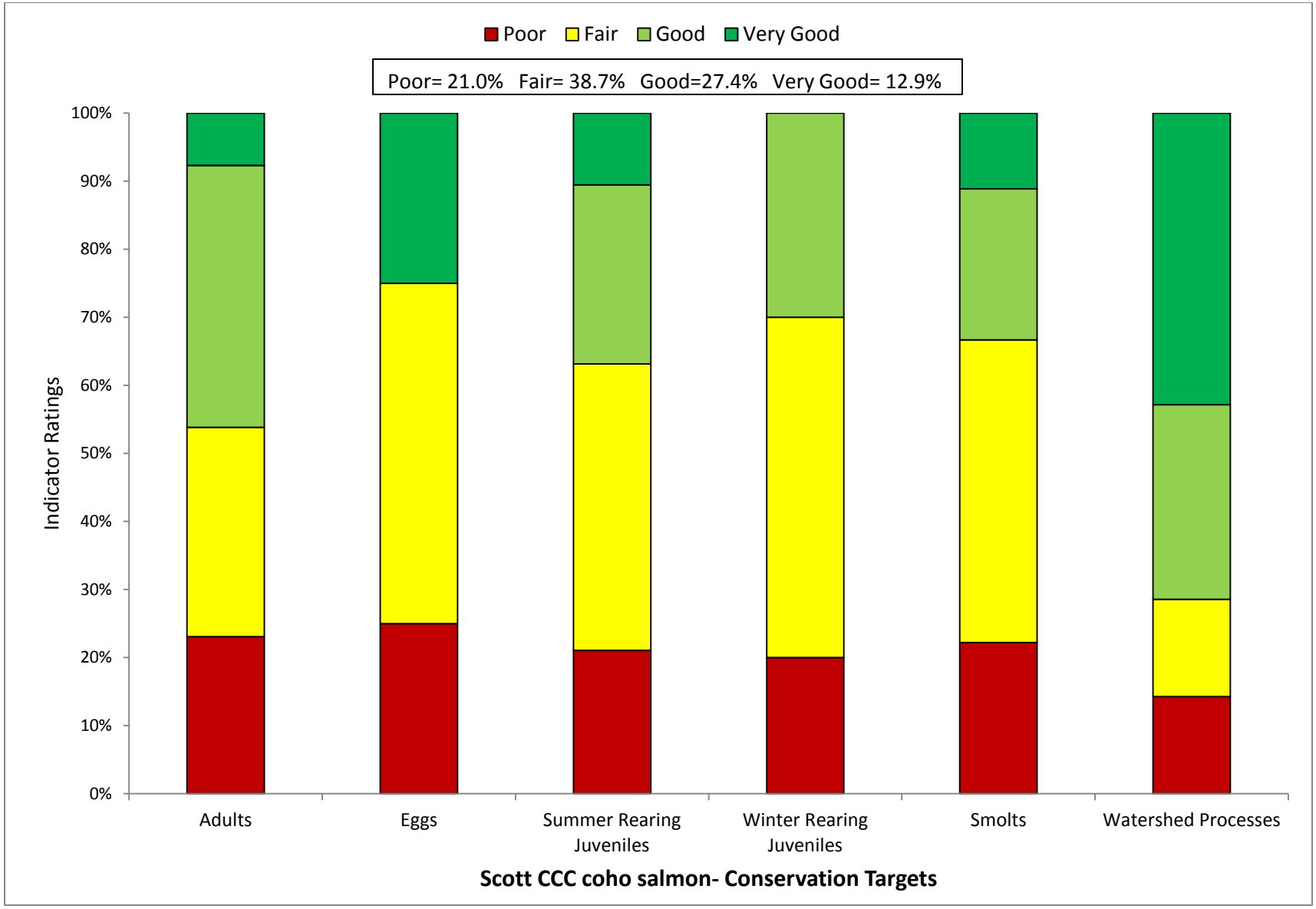


Figure 2 Viability Results by Lifestage

Table 1: CAP Viability Results ~ Scott(s) Creek

Target	Attribute	Indicator	Result	Rating	Method	Desired Criteria
Adults	Habitat Complexity	Large Wood Frequency (BFW 0-10 meters)	**4 to 6 Key Pieces/100m**	Fair	NMFS Expert Estuary/Lagoon Panel	6 to 11 key pcs/100m
Adults	Habitat Complexity	Large Wood Frequency (BFW 10-100 meters)	**<1 to 1.3 Key Pieces/100m**	Fair	NMFS Expert Estuary/Lagoon Panel	1.3 to 4 Key Pieces/100 meters
Adults	Habitat Complexity	Pool/Riffle/Flatwater Ratio	**20% streams 12% IP-km accessible (>30% Pools; >20% Riffles)**	Poor	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Adults	Habitat Complexity	Shelter Rating	**20% streams 2% 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 =35-50**	Good	SEC Analysis/CDFG Data	NMFS Flow Protocol: Risk Factor Score 35-50
Adults	Passage/Migration	Passage at Mouth or Confluence	**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	Passage/Migration	Physical Barriers	**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	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)	**70-79% Density rating "D" across IP-km**	Fair	SEC Analysis/CDFG Data	≥80% Density rating "D" across IP-km
Adults	Sediment	Quantity & Distribution of Spawning Gravels	**>90% of IP-km accessible**	Very Good	SEC Analysis/CDFG Data	75% of IP-Km to 90% of IP-km
Adults	Velocity Refuge	Floodplain Connectivity	**>80% Response Reach Connectivity**	Good	SEC Analysis/CDFG Data	>80% Response Reach Connectivity
Adults	Water Quality	Toxicity	**No Acute or Chronic**	Good	SEC Analysis/CDFG Data	No Acute or Chronic
Adults	Water Quality	Turbidity	**50% to 74% of streams/ IP-km maintains severity score of 3 or lower**	Fair	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower
Adults	Viability	Density	**<1 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 =33**	Very Good	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)	**15-17% (0.85mm) and <30% (6.4mm)**	Fair	NMFS Instream Flow Analysis	12-14% (0.85mm) and <30% (6.4mm)
Eggs	Sediment	Gravel Quality (Embeddedness)	**40% streams 68% IP-km (>50% stream average scores of 1 & 2)**	Fair	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)	**4 to 6 Key Pieces/100m**	Fair	NMFS Instream Flow Analysis	6 to 11 key pcs/100m
Summer Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 meters)	**<1 to 1.3 Key Pieces/100m**	Fair	NMFS Instream Flow Analysis	1.3 to 4 Key Pieces/100 meters
Summer Rearing Juveniles	Habitat Complexity	Percent Primary Pools	**60% streams 93% IP-km (>49% of pools are primary pools)**	Good	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	**20% streams 12% IP-km (>30% Pools; >20% Riffles)**	Poor	NMFS Instream Flow Analysis	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Summer Rearing Juveniles	Habitat Complexity	Shelter Rating	**20% streams 2% 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**	Fair	NMFS Instream Flow Analysis	NMFS Flow Protocol: Risk Factor Score 35-50
Summer Rearing Juveniles	Hydrology	Flow Conditions (Instantaneous Condition)	**Risk Factor Score = <35**	Very Good	NMFS Watershed Characterization	NMFS Flow Protocol: Risk Factor Score 35-50
Summer Rearing Juveniles	Hydrology	Number, Condition and/or Magnitude of Diversions	**3.8 Diversions /10 IP-km**	Fair	NMFS Watershed Characterization	0.01 - 1 Diversions/10 IP km
Summer Rearing Juveniles	Passage/Migration	Passage at Mouth or Confluence	**75% of IP-km to 90% of IP-km accessible**	Good	NMFS Watershed Characterization	75% of IP-Km to 90% of IP-km
Summer Rearing Juveniles	Passage/Migration	Physical Barriers	**75% of IP-km to 90% of IP-km accessible**	Good	Population Profile/BPJ	75% of IP-Km to 90% of IP-km
Summer Rearing Juveniles	Riparian Vegetation	Canopy Cover	**100% streams 100% IP-km (>85% average stream canopy)**	Very Good	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)	**70-79% Density rating "D" across IP-km**	Fair	SEC or PAD/CDFG Data	≥80% Density rating "D" across IP-km
Summer Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	**40% streams 68% IP-km (>50% stream average scores of 1 & 2)**	Fair	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 (MWMT)	**50 to 74% IP km (<16 C MWMT)**	Fair	Population Profile/BPJ	75 to 89% IP km (<16 C MWMT)
Summer Rearing Juveniles	Water Quality	Toxicity	**No Acute or Chronic**	Good	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	**< 0.2 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)	**4 to 6 Key Pieces/100m**	Fair	NMFS Watershed Characterization/CWHR	6 to 11 key pcs/100m
Winter Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 meters)	**<1 to 1.3 Key Pieces/100m**	Fair	NMFS Watershed Characterization/CWHR	1.3 to 4 Key Pieces/100 meters
Winter Rearing Juveniles	Habitat Complexity	Pool/Riffle/Flatwater Ratio	**20% streams 12% IP-km (>30% Pools; >20% Riffles)**	Poor	NMFS Watershed Characterization/CWHR	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Winter Rearing Juveniles	Habitat Complexity	Shelter Rating	**20% streams 2% 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	**75% of IP-km to 90% 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)	**70-79% Density rating "D" across IP-km**	Fair	SEC Analysis/CDFG Data	≥80% Density rating "D" across IP-km
Winter Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	**40% streams 68% IP-km (>50% stream average scores of 1 & 2)**	Fair	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	**>80% Response Reach Connectivity**	Good	SEC Analysis/CDFG Data	>80% Response Reach Connectivity
Winter Rearing Juveniles	Water Quality	Toxicity	**No Acute or Chronic**	Good	NMFS Watershed Characterization	No Acute or Chronic
Winter Rearing Juveniles	Water Quality	Turbidity	**50% to 74% of streams/ IP-km maintains severity score of 3 or lower**	Fair	NMFS Watershed Characterization	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower

Smolts	Estuary/Lagoon	Quality & Extent	**Impaired but functioning**	Fair	SEC Analysis/CDFG Data	Properly Functioning Condition
Smolts	Habitat Complexity	Shelter Rating	**20% streams 2% 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	**3.8 Diversions/10 IP-km**	Fair	Population Profile	0.01 - 1 Diversions/10 IP km
Smolts	Hydrology	Passage Flows	**Risk Factor Score =67**	Fair	TRT Spence (2008)	NMFS Flow Protocol: Risk Factor Score 35-50
Smolts	Passage/Migration	Passage at Mouth or Confluence	**>90% of IP-km accessible**	Very Good	TRT Spence (2008)	75% of IP-Km to 90% of IP-km
Smolts	Smoltification	Temperature	**75-90% IP-Km (>6 and <16 C)**	Good	TRT Spence (2008)	75-90% IP-Km (>6 and <16 C)
Smolts	Water Quality	Toxicity	**No Acute or Chronic**	Good	TRT Spence (2008)	No Acute or Chronic
Smolts	Water Quality	Turbidity	**50% to 74% of streams/ IP-km maintains severity score of 3 or lower**	Fair	EPA/RWQCB/NMFS Criteria	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower
Smolts	Viability	Abundance	**Smolt abundance which produces moderate risk spawner density per Spence (2008)**	Poor	Newcombe and Jensen 2003	Smolt abundance to produce low risk spawner density per Spence (2008)
Watershed Processes	Hydrology	Impervious Surfaces	**0.104% of Watershed in Impervious Surfaces**	Very Good	SEC Analysis	3-6% of Watershed in Impervious Surfaces
Watershed Processes	Landscape Patterns	Agriculture	**0.478% of Watershed in Agriculture**	Very Good	EPA/RWQCB/NMFS Criteria	10-19% of Watershed in Agriculture
Watershed Processes	Landscape Patterns	Timber Harvest	**25-15% of Watershed in Timber Harvest**	Good	Newcombe and Jensen 2003	25-15% of Watershed in Timber Harvest
Watershed Processes	Landscape Patterns	Urbanization	**0% 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**	Fair	EPA/RWQCB/NMFS Criteria	1.6 to 2.4 Miles/Square Mile
Watershed Processes	Sediment Transport	Streamside Road Density (100 m)	**2.8 Miles/Square Mile**	Poor	Newcombe and Jensen 2003	0.1 to 0.4 Miles/Square Mile

Table 2: CAP Threats Results ~ Scott(s) Creek

	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	Low	Low	Medium	Medium	Low	Low	Medium
2	Channel Modification	Medium	Low	High	Low	Medium	Low	Medium
3	Disease, Predation and Competition	Low	-	Medium	Low	Medium	Low	Medium
4	Fire, Fuel Management and Fire Suppression	Low	Medium	Medium	High	Medium	Medium	Medium
5	Fishing and Collecting	Medium	-	Low	-	Medium	-	Medium
6	Hatcheries and Aquaculture	Low	-	Low	Low	Low	-	Low
7	Livestock Farming and Ranching	Low	Low	Medium	Low	Low	Low	Low
8	Logging and Wood Harvesting	Low	Low	Medium	Medium	Low	Low	Medium
9	Mining	-	-	-	-	-	-	-
10	Recreational Areas and Activities	Low	Low	Medium	Low	Low	Low	Low
11	Residential and Commercial Development	Low	Low	Medium	Medium	Low	Low	Medium
12	Roads and Railroads	Low	Medium	High	High	Medium	Medium	High
13	Severe Weather Patterns	Medium	Medium	High	Medium	Low	Low	Medium
14	Water Diversion and Impoundments	Medium	Low	Medium	Low	Medium	Low	Medium
	Threat Status for Targets and Project	Medium	Medium	High	High	Medium	Medium	High

Central CA Coast Coho Salmon ~ Scott 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 the extent of estuarine habitat

1.1.1.1. **Action Step:** Restore estuarine habitat and the associated wetlands and sloughs by providing fully functioning habitat (CDFG 2004).

1.1.1.2. **Action Step:** Remove structures impairing or reducing the historical tidal prism, where feasible, and benefits to salmonids and/or the estuarine environment are predicted. Work with Caltrans to restore estuary tidal prism as part of the proposed bridge replacement for the Highway 1 bridge over Scott Creek lagoon.

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

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

1.1.2.2. **Action Step:** Monitor sandbar to evaluate timing and frequency of natural and artificial breaching events.

1.1.3. **Recovery Action:** Rehabilitate natural river mouth dynamics

1.1.3.1. **Action Step:** Highway 1 bridge reconstruction should restore historical river mouth dynamics to minimize delayed natural breaching.

2. Restoration- Floodplain Connectivity

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

2.1.1. **Recovery Action:** Rehabilitate and enhance floodplain connectivity

2.1.1.1. **Action Step:** Encourage breaching of old levees in the lower riparian reaches of Scott Creek.

2.1.1.2. **Action Step:** Reclaim alcove and side channels for winter refugia and summer rearing.

2.1.1.3. **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:** Install properly sized large woody debris to appropriate viability table targets.

3.1.1.2. **Action Step:** Conduct conifer release to promote growth of larger diameter trees where appropriate.

3.1.1.3. **Action Step:** Do not remove woody material from the stream channel without consultation and approval from a fishery biologist with experience working in small, Central California Coastal streams.

3.1.2. **Recovery Action:** Improve shelter rating

3.1.2.1. **Action Step:** Maintain current LWD, boulders, and other structure providing features to maintain current stream complexity, pool frequency, and depth (CDFG 2004).

3.1.3. **Recovery Action:** Improve pool:riffle:flatwater ratio

3.1.3.1. **Action Step:** Increase the frequencies of riffles in 75% of the streams within the watershed

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:** Minimize redd scour

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

4.1.2. **Recovery Action:** Improve flow conditions (baseflow conditions)

4.1.2.1. **Action Step:** Promote off-channel storage to reduce impacts of water diversion (storage tanks for rural residential users) in the upper watershed.

4.1.2.2. **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 (CDFG 2004).

4.1.2.3. **Action Step:** Promote irrigation efficiency projects for agricultural practices.

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.

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:** Improve instream gravel quality

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

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

9.1.1.3. **Action Step:** Restoration projects that upgrade or decommission high risk roads or other infrastructure in Core areas should be considered an extremely high priority for funding (e.g., PCSRF).

9.1.1.4. **Action Step:** Evaluate and remove roadside berms and other infrastructure that lead to increased runoff velocities and result in increased sediment discharge.

9.1.1.5. **Action Step:** Decommission riparian road systems and/or upgrade roads (and skid trails on forestlands) and other infrastructure delivering sediment into watercourses (CDFG 2004).

10. Restoration- Viability

10.1. **Objective:** Address other natural or manmade factors affecting the species continued existence

10.1.1. **Recovery Action:** Increase spatial structure and diversity

10.1.1.1. **Action Step:** Continue funding the Scott Creek lifecycle station.

10.1.1.2. **Action Step:** Implement standardized watershed assessments to identify limiting factors specific to the watershed. Encourage all major landowners to adopt consistent assessment methods.

10.1.1.3. **Action Step:** Work with landowners to conduct actions (e.g., maintain road and trail closures) to minimize or prevent trespass and poaching.

10.1.1.4. **Action Step:** Improve NMFS and CDFG coordination to minimize permitting constraints for hatchery operations critical to the broodstock program.

10.1.1.5. **Action Step:** Develop and implement a monitoring program to evaluate the performance of recovery efforts.

10.1.1.6. **Action Step:** Preserve the remaining genetic and phenotypic characteristics that promote life history variability through captive broodstock, supplementation, and gene-bank programs to reduce risk of extirpation.

10.1.2. **Recovery Action:** Increase abundance

10.1.2.1. **Action Step:** Continue operation of the MBSTP Kingfisher Flat Hatchery as a conservation hatchery, following the guidelines of the CDFG and NMFS (CDFG 2004).

10.1.2.2. **Action Step:** Expand the Kingfisher Flat Hatchery.

10.1.3. **Recovery Action:** Increase spawner density

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

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 long-term survival and recovery for coho salmon and their habitat.

10.2.1.2. **Action Step:** Continue ongoing juvenile sampling efforts in the watershed. Establish consistent reporting methods to ensure ESU-wide consistency.

10.2.1.3. **Action Step:** Initiate a new habitat typing effort in Scott Creek to guide future restoration actions.

11. Restoration- Water Quality

No species-specific actions were developed.

THREAT ABATEMENT ACTIONS

12. Threat- Agricultural Practices

No species-specific actions were developed.

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

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

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

13.1.1.3. **Action Step:** Promote bio-engineering solutions as appropriate (e.g. where critical infrastructure is located) for bank hardening projects.

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

13.1.2. **Recovery Action:** Prevent impairment to instream habitat complexity (reduced large wood and/or shelter)

13.1.2.1. **Action Step:** Minimize the use of rip-rap in future bank stabilization projects. Thoroughly evaluate all alternatives to rip-rap, and at a minimum, incorporate complexity features into stabilization projects.

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

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

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:** Protect existing areas that provide winter refuge and seasonal habitats for juvenile salmonids from channelization projects.

14. Threat- Disease/Predation/Competition

No species-specific actions were developed.

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

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

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

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

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

15.2.1.1. **Action Step:** Avoid use of aerial fire retardants and foams within 300 feet of riparian areas throughout the current range of CCC coho salmon.

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

15.2.1.3. **Action Step:** In the event of a wildfire, CalFire Resource Advisors should contact the resource agencies for ESA consultation (or technical assistance) about the incident.

15.2.2. **Recovery Action:** Prevent impairment to hydrology

15.2.2.1. **Action Step:** Draft water from non-fish bearing waters if at all possible. In larger fish-bearing streams, excavate active channel areas outside of wetted width to create off-stream pools for water source.

16. Threat- Fishing/Collecting

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

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

16.1.1.1. **Action Step:** Install/construct permanent signs at all major public access points along Scotts Creek that clearly identify differences in body morphology of all potentially present adult salmonids with color photos (e.g., caudal fin spotting, caudal fork shape, coloration of lower jaw, peduncle width, etc.).

16.1.1.2. **Action Step:** Promote CalTip to discourage poaching (CDFG 2004).

16.1.1.3. **Action Step:** Prohibit offshore salmon fishing until January 15 (or until sandbar opens naturally) within one mile of the river mouth.

16.1.1.4. **Action Step:** Work with CDFG to improve the Fishing Regulation manual to clearly identify differences in body morphology of all potentially present adult salmonids with color photos of diagnostic features (e.g., caudal fin spotting, caudal fin shape, coloration of lower jaw, peduncle width, etc.).

16.1.1.5. **Action Step:** Work with CDFG to modify Section 8.00 (b) (1) low flow minimum flow closure for Scotts Creek.

17. Threat- Hatcheries

No species-specific actions were developed.

18. Threat- Livestock

No species-specific actions were developed.

19. Threat- Logging

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

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

19.1.1.1. **Action Step:** Timber harvest planning should evaluate and avoid or minimize impacts to off channel habitat, floodplains, ponds, and oxbows.

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

19.1.2.1. **Action Step:** Evaluate road surface treatment options to halt or minimize impacts from water drafting and diversion during droughts and summer low flow periods.

19.1.3. **Recovery Action:** Prevent impairment to instream habitat complexity (reduced large wood and/or shelter)

19.1.3.1. **Action Step:** Retain the largest trees in all riparian zones (including intermittent and ephemeral streams) for bank stability and long-term wood recruitment.

19.1.4. **Recovery Action:** Prevent alterations to sediment transport (road condition/density, dams, etc.)

19.1.4.1. **Action Step:** Avoid the new road construction in riparian zones (< 100 feet).

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

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

19.2.1.1. **Action Step:** Review "fire-safe" exemptions to prevent illegal conversions, riparian corridor impacts and other watershed impacts.

20. Threat- Mining

No species-specific actions were developed.

21. Threat- Recreation

No species-specific actions were developed.

22. Threat- Residential/Commercial Development

No species-specific actions were developed.

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 instream substrate

23.1.1.1. **Action Step:** Maintain adequate energy dissipators for culverts and other drainage pipe outlets where needed.

23.1.1.2. **Action Step:** Extend the monitoring period and upgrade THP road maintenance after harvest.

23.1.1.3. **Action Step:** Decommission riparian road systems and/or upgrade roads (and skid trails on forestlands) that deliver sediment into adjacent watercourses (CDFG 2004).

23.1.2. **Recovery Action:** Prevent impairment to the estuary

23.1.2.1. **Action Step:** Relocate or extend the proposed replacement bridge for Highway 1 over Scott Creek in order to allow Scott Creek to re-establish its historical outlet into the ocean. Relocating or extending the replacement bridge could facilitate the re-establishment of the historical tidal prism in the lower lagoon.

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

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

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

23.2.1. **Recovery Action:** Prevent impairment to instream substrate

23.2.1.1. **Action Step:** Avoid new road construction within floodplains, riparian areas, unstable soils or other sensitive areas until a watershed specific and/or agency/company specific road management plan is created and implemented.

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

23.2.1.3. **Action Step:** Licensed engineering geologists should review and approve grading on inner gorge slopes.

23.2.1.4. **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).

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

23.2.1.6. **Action Step:** Stream crossings should be identified and mapped with the intention of replacement or removal if they cannot pass 100 year flow. Design should include fail safe measures to accommodate culvert overflow without causing massive road fill failures.

23.2.1.7. **Action Step:** Encourage appropriate restrictions for winter use of unsurfaced roads along rural utility easements; and establish best management practices for clearance within riparian corridors.

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

24.1.1.1. **Action Step:** Work with water users to minimize depletion of summer base flows.

24.1.1.2. **Action Step:** Design estuary restoration projects to include subtidal habitats and natural bioengineering techniques that buffer wave action and increase sediment deposition to minimize shoreline and wetland erosion.

24.1.2. **Recovery Action:** Prevent impairment to hydrology

24.1.2.1. **Action Step:** Implement water conservation strategies that provide for drought contingencies without relying on interception of surface flows or groundwater depletion.

24.1.2.2. **Action Step:** If predicted flows are below a level considered critical to maintain habitat conditions for coho salmon, measures to reduce water consumption should be initiated by users in the watershed through conservation programs.

24.1.2.3. **Action Step:** Pursue opportunities to acquire or lease water, or acquire water rights from willing sellers, for coho salmon recovery purposes. Develop incentives for water right holders to dedicate instream flows for the protection of coho salmon (CDFG 2004)(Water Code § 1707).

24.1.2.4. **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.

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

24.2.1. **Recovery Action:** Prevent impairment to instream habitat complexity (reduced large wood and/or shelter)

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

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

24.2.2.1. **Action Step:** Protect high-risk shallow-seated landslide areas and surfaces prone to erosion from being mobilized by intense storm events.

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

24.2.3.1. **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.

24.2.3.2. **Action Step:** 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.

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

24.2.4.1. **Action Step:** Establish and enforce minimum summer releases from the Mill Creek reservoir to ensure rearing habitat is maintained in Mill Creek.

24.2.4.2. **Action Step:** Agencies and landowners should develop contingencies for drought conditions in a manner compatible with CCC coho salmon recovery needs.

24.2.4.3. **Action Step:** CDFG, SWRCB, RWQCB, CalFire, and other agencies and landowners, in cooperation with NMFS, should evaluate the rate and volume of water drafting for dust control in streams or tributaries and where appropriate, minimize water withdrawals that could impact coho salmon. These agencies should consider existing regulations or other mechanisms when evaluating alternatives to water as a dust palliative (including EPA-certified compounds) that are consistent with maintaining or improving water quality (CDFG 2004).

24.2.4.4. **Action Step:** Encourage SWRCB to bring illegal water diverters and out-of-compliance diverters into compliance with State law.

24.2.4.5. **Action Step:** Improve coordination between agencies and others to address season of diversion, off-stream reservoirs, bypass flows protective of coho salmon and their habitats, and avoidance of adverse impacts caused by water diversion (CDFG 2004).

24.2.4.6. **Action Step:** Encourage CalFire to modify water right for diversion in upper headwaters of Scott Creek.

24.2.4.7. **Action Step:** Evaluate dam and impact of water diversions in Boyer Creek (trib to Big Cr)

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

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

24.3.1.1. **Action Step:** Evaluate and prepare contingency plans to breach estuary sandbars to facilitate adult upmigration when instream flows are adequate for passage and spawning IF sandbar remains closed by mid-January and conservation hatchery remains in operation.

24.4. **Objective:** Address the overutilization for commercial, recreational, scientific or educational purposes

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

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

25. Threat- Water Diversion/Impoundment

No species-specific actions were developed.

26. Threat- Watershed Process

No species-specific actions were developed.

Table 3: Implementation Schedule ~ Scott(s) Creek

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	
ScC-CCC-1.1	**Objective**	**Estuary**	**Address the present or threatened destruction, modification or curtailment of the species habitat or range**										
ScC-CCC-1.1.1	Recovery Action	Estuary	Increase the extent of estuarine habitat										
ScC-CCC-1.1.1.1	Action Step	Estuary	Restore estuarine habitat and the associated wetlands and sloughs by providing fully functioning habitat (CDFG 2004).	2	5	CA Coastal Commission, CalPoly, CalTrans, NOAA SWFSC, USACE	931					931	Scott Creek estuary was reduced in size following European arrival and this habitat loss is currently believed to be a major limiting factor for salmonids. The upper estuary was converted for agricultural purposes, and much of the historical tidal prism is reduced due to channelization for the Highway 1 Bridge constructed in the early 1940's. Estuary/lagoons on California's central coast have been extensively documented as superior rearing habitat for steelhead and can contribute a disproportionate total number of returning adults compared to stream habitats when conditions are even marginally suitable (Bond et al., 2008). This recommendation includes restoration of complex habitat features such as large woody material to facilitate creation of deeper pools and cover. Coho will benefit from restoration during smolt transition and adult upmigration. Cost for treating three acres (assume 10% of total estuarine acres) at a rate of $310,216/acre.
ScC-CCC-1.1.1.2	Action Step	Estuary	Remove structures impairing or reducing the historical tidal prism, where feasible, and benefits to salmonids and/or the estuarine environment are predicted. Work with Caltrans to restore estuary tidal prism as part of the proposed bridge replacement for the Highway 1 bridge over Scott Creek lagoon.	1	10	CA Coastal Commission, CalPoly, CalTrans, NOAA SWFSC						TBD	Caltrans is currently evaluating bridge replacement - differentiating between anticipated replacement costs and additional actions for coho recovery benefits can not be estimated at this time due to uncertainty regarding Caltrans preferred alternative. Replacement of the bridge offers a rare opportunity to restore two sharp bends to the lower channel and replace the leveed and straightened channel.
ScC-CCC-1.1.2	Recovery Action	Estuary	Reduce frequency of artificial breaching events										
ScC-CCC-1.1.2.1	Action Step	Estuary	Post durable and attractive interpretive signage at the beach to discourage casual breaching of the lagoon sandbar.	2	10	CalTrans, CDFG, Santa Cruz County	1.50	1.50				3	Cost of signs vary widely depending on materials used and content of signs. Assume $1,000/sign with a minimum of 3 signs for lagoon.
ScC-CCC-1.1.2.2	Action Step	Estuary	Monitor sandbar to evaluate timing and frequency of natural and artificial breaching events.	2	10	CalPoly, CalTrans, CDFG, NOAA SWFSC						In-Kind	
ScC-CCC-1.1.3	Recovery Action	Estuary	Rehabilitate natural river mouth dynamics										

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	
ScC-CCC-1.1.3.1	Action Step	Estuary	Highway 1 bridge reconstruction should restore historical river mouth dynamics to minimize delayed natural breaching.	1	10	CA Coastal Commission, CalPoly, CalTrans, Santa Cruz County						TBD	The major channel modification on Scott Creek is at the lagoon where Caltrans realigned (straightened) the stream to a new location for the original Highway 1 bridge. The original channel made a sharp bend to the west and then a second sharp bend at the cliff to enter the ocean. Both of these bends would have produced deep scour holes in the lagoon, serving as good feeding and transition habitat for down-migrating smolts. The sandbar at the mouth would also have been less likely to have delayed opening in the winter as currently occurs with the current alignment. Re-establishing the historical alignment will have major benefits to both steelhead and coho salmon.
ScC-CCC-2.1	**Objective**	**Floodplain Connectivity**	**Address the present or threatened destruction, modification or curtailment of the species habitat or range.**										
ScC-CCC-2.1.1	Recovery Action	Floodplain Connectivity	Rehabilitate and enhance floodplain connectivity										
ScC-CCC-2.1.1.1	Action Step	Floodplain Connectivity	Encourage breaching of old levees in the lower riparian reaches of Scott Creek.	1	10	CalPoly, CDFG, NOAA SWFSC, Scotts Creek Watershed Council, USACE	62.00	62.00				124	Breaching will improve floodplain function and provide high water refuge for juvenile salmonids. Levees were constructed on the lower Scott Creek floodplain to facilitate farming and to concentrate and direct flows under the Highway 1 bridge in the estuary. These levees receive little if any maintenance, and in the riverine reach the levees are well vegetated. Nonetheless, the levees continue to impair habitat quality by reducing the extent of available winter refugia. The levees also reduce the total amount of rearing habitat in the estuary and reduce the extent and duration of floodplain connectivity. Cost estimate based on treating 3 miles (assume 1 project/mile in 25% High IP) at a rate of $41,092/mile.
ScC-CCC-2.1.1.2	Action Step	Floodplain Connectivity	Reclaim alcove and side channels for winter refugia and summer rearing.	1	15	Big Creek Lumber Co., CalPoly, Santa Cruz County, Scotts Creek Watershed Council						TBD	Cost accounted for in above action steps.

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	
ScC-CCC-2.1.1.3	Action Step	Floodplain Connectivity	De-commission elevated road alignments through riparian zones or adjacent to stream channels which functionally limit seasonal floodplain access.	3	20	Big Creek Lumber Co., CalFire, CalPoly, Santa Cruz County						TBD	In areas where highly entrenched channels occur adjacent to structures, roads, and similar improvements, landowners often attempt to stabilize the streambanks to protect their property, which results in a net degradation of riparian and instream habitats. Due to the proximity of roads adjacent to stream channels, it is likely that future bank hardening will occur in the watershed. Some stream reaches in Scott Creek appear entrenched, and it is anticipated that future bank hardening will occur in some areas of the watershed. De-commissioning of these roads will preclude future bank hardening and should enhance floodplain connectivity. Cost accounted for in SEDIMENT.
ScC-CCC-3.1	**Objective**	**Habitat Complexity**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
ScC-CCC-3.1.1	Recovery Action	Habitat Complexity	Increase large wood frequency										
ScC-CCC-3.1.1.1	Action Step	Habitat Complexity	Install properly sized large woody debris to appropriate viability table targets.	2	5	Big Creek Lumber Co., CalFire, CalPoly, Scotts Creek Watershed Council	100.00					100	Cost based on $28,500/mile of stream complexity improvement for 3.5 miles of high IP. If engineered wood structures are used in replacement for the same 6.5 miles, costs would equal approximately $750,000. Recovery actions should focus on improving spawning habitat through placement of standard log/boulder habitat structures that can effectively increase holding and rearing habitat. In stream reaches with little immediate downstream infrastructure, properly sized trees could be felled into stream channels to create these structures. Coordinating instream large wood placement with future timber harvest activities in the watershed could result in substantial cost savings and serve as an opportunity for effective timber harvest plan mitigation. Winter 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 provide cover and facilitate scour 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. See 4.1.1 for more information.

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	
ScC-CCC-3.1.1.2	Action Step	Habitat Complexity	Conduct conifer release to promote growth of larger diameter trees where appropriate.	3	10	Big Creek Lumber Co., CalFire, CalPoly, Lockheed	65.00	65.00				130	Returning riparian corridors to properly functioning condition is unlikely to address instream habitat conditions in a timely manner. While improved riparian function will ultimately increase wood recruitment into streams, near-term restoration measures will be required to fix degraded instream conditions. Cost based on treating 1 mile (assume 80 acres/mile in 5% High IP with a 1 mile minimum) at a rate of $1,621/acre.
ScC-CCC-3.1.1.3	Action Step	Habitat Complexity	Do not remove woody material from the stream channel without consultation and approval from a fishery biologist with experience working in small, Central California Coastal streams.	1	100	CDFG, Santa Cruz County, USACE						In-Kind	
ScC-CCC-3.1.2	Recovery Action	Habitat Complexity	Improve shelter rating										
ScC-CCC-3.1.2.1	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	
ScC-CCC-3.1.3	Recovery Action	Habitat Complexity	Improve pool:riffle:flatwater ratio										
ScC-CCC-3.1.3.1	Action Step	Habitat Complexity	Increase the frequencies of riffles in 75% of the streams within the watershed	2	10	CDFG, NMFS							Cost accounted for in above action steps (i.e. increase large wood frequency).
ScC-CCC-4.1	**Objective**	**Hydrology**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
ScC-CCC-4.1.1	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	
ScC-CCC-4.1.1.1	Action Step	Hydrology	Install properly sized large woody debris to appropriate viability table targets.	1	5	Big Creek Lumber Co., CalPoly	749					749	Redd scour is likely a limiting factor in some reaches of Scott 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 steelhead 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. See 3.1.1.1 for more information.
ScC-CCC-4.1.2	Recovery Action	Hydrology	Improve flow conditions (baseflow conditions)										
ScC-CCC-4.1.2.1	Action Step	Hydrology	Promote off-channel storage to reduce impacts of water diversion (storage tanks for rural residential users) in the upper watershed.	2	20	CalPoly, CDFG, IWRP, Santa Cruz RCD, Scotts Creek Watershed Council, Trout Unlimited						TBD	The major land use requiring large quantities of water are the organic farms in lower Scotts Creek owned by CalPoly. Most of the water diverted comes from wells. Harvesting of water during the winter could reduce the potential impact that these wells may have on surface flows in lower Scott Creek.
ScC-CCC-4.1.2.2	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 (CDFG 2004).	1	20	Big Creek Lumber Co., CalFire, CalPoly, CDFG, Lockheed, SWRCB						TBD	
ScC-CCC-4.1.2.3	Action Step	Hydrology	Promote irrigation efficiency projects for agricultural practices.	2	10	CalPoly, Farm Bureau, IWRP, Santa Cruz RCD							
ScC-CCC-9.1	**Objective**	**Sediment**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
ScC-CCC-9.1.1	Recovery Action	Sediment	Improve instream gravel quality										

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	
ScC-CCC-9.1.1.1	Action Step	Sediment	Locations for sediment catchment basins should be identified, developed and maintained, where appropriate.	3	20	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, Santa Cruz County	6.25	6.25	6.25	6.25		25	Costs will vary on landowner participation and year to year variation in rainfall patterns. This cost estimate does not include maintenance obligations.
ScC-CCC-9.1.1.2	Action Step	Sediment	Permitting agencies (State, Federal, and local) should evaluate all authorized erosion control measures during the winter period.	3	100	CalFire, CDFG, NMFS PRD, NRCS, RWQCB, Santa Cruz County, USACE, USFWS						In-Kind	This should be considered a standard business practice for all regulatory and oversight agencies.
ScC-CCC-9.1.1.3	Action Step	Sediment	Restoration projects that upgrade or decommission high risk roads or other infrastructure in Core areas should be considered an extremely high priority for funding (e.g., PCSRF).	1	10	Big Creek Lumber Co., CalFire, California Coastal Conservancy, CalPoly, CalTrans, NRCS, Santa Cruz County	21.00	21.00				42	Cost based on assumption of $13,680/mile to decommission 10% (~3 miles) of road network in the watershed. Road upgrades for the same 10% of the road network would equate to $71,820.
ScC-CCC-9.1.1.4	Action Step	Sediment	Evaluate and remove roadside berms and other infrastructure that lead to increased runoff velocities and result in increased sediment discharge.	3	10	Big Creek Lumber Co., CalFire, CalPoly	35.91	35.91				72	Roadside berms are a common feature on many private and county roads in Santa Cruz County. Many of the private timberland roads have been upgraded and are hydrologically disconnected. A similar effort should occur on the remaining roads in the watershed. The cost of this action assumes 10% of roads (~3 miles) will be treated at a cost of $23,940/mile.
ScC-CCC-9.1.1.5	Action Step	Sediment	Decommission riparian road systems and/or upgrade roads (and skid trails on forestlands) and other infrastructure delivering sediment into watercourses (CDFG 2004).	3	10	Big Creek Lumber Co., CalFire, CalPoly	10.50	10.50				21	Costs to decommission 1.5 miles of riparian roads based on $13,680/mile. The costs are related to Roads and Railroads.
ScC-CCC-10.1	**Objective**	**Viability**	**Address other natural or manmade factors affecting the species continued existence**										
ScC-CCC-10.1.1	Recovery Action	Viability	Increase spatial structure and diversity										

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	
ScC-CCC-10.1.1.1	Action Step	Viability	Continue funding the Scott Creek lifecycle station.	1	5	CalPoly, NOAA SWFSC	235.00					235	Cost for life cycle monitoring station estimated at $234,600. NMFS Southwest Fisheries Science Center currently operates the only lifecycle station in the Santa Cruz Mountains Diversity Stratum on lower Scott Creek. This station provides essential information on the population size of adult and smolt salmonids in Scott Creek, and has been in continuous operation since 2003. Information from the station can be used to calibrate future population estimates for other watersheds in the Santa Cruz Mountains. Upgrades to the facility (i.e., construction of a permanent weir) would ultimately reduce operational costs, increase research opportunities, increase worker safety, and provide a more accurate estimate of the coho salmon population in Scott Creek. Continued operation is strongly recommended.
ScC-CCC-10.1.1.2	Action Step	Viability	Implement standardized watershed assessments to identify limiting factors specific to the watershed. Encourage all major landowners to adopt consistent assessment methods.	1	5	Big Creek Lumber Co., CalFire, CalPoly, CDFG, IWRP, NMFS, Santa Cruz RCD, USFWS							Standardized assessments are a high priority in Scott Creek due to imperiled status of coho salmon and immediate need to secure the Scott Creek population. Scott Creek could serve as a key demonstration watershed in the Santa Cruz Mountains Diversity Stratum.
ScC-CCC-10.1.1.3	Action Step	Viability	Work with landowners to conduct actions (e.g., maintain road and trail closures) to minimize or prevent trespass and poaching.	3	20	Big Creek Lumber Co., CalFire, CalPoly, Private Landowners						In-Kind	Cost is expected to be minimal and already largely covered as part of an existing outreach program to landowners and concerned citizen in the Scott Creek watershed.
ScC-CCC-10.1.1.4	Action Step	Viability	Improve NMFS and CDFG coordination to minimize permitting constraints for hatchery operations critical to the broodstock program.	2	50	CDFG, Monterey Bay Salmon and Trout Project, NMFS						In-Kind	
ScC-CCC-10.1.1.5	Action Step	Viability	Develop and implement a monitoring program to evaluate the performance of recovery efforts.	3	10	CalPoly, CDFG, NOAA SWFSC	63.50	63.50				127	Cost for fish/habitat effectiveness monitoring estimated at $126,758/project.
ScC-CCC-10.1.1.6	Action Step	Viability	Preserve the remaining genetic and phenotypic characteristics that promote life history variability through captive broodstock, supplementation, and gene-bank programs to reduce risk of extirpation.	1	100	Monterey Bay Salmon and Trout Project, NOAA SWFSC						In-Kind	
ScC-CCC-10.1.2	Recovery Action	Viability	Increase abundance										

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	
ScC-CCC-10.1.2.1	Action Step	Viability	Continue operation of the MBSTP Kingfisher Flat Hatchery as a conservation hatchery, following the guidelines of the CDFG and NMFS (CDFG 2004).	1	20	CDFG, Monterey Bay Salmon and Trout Project, NMFS PRD, NOAA SWFSC, Pacific States Marine Fisheries Commission						TBD	Operation of this facility is essential to conservation of coho populations and preservation of southern coho salmon genetic resources. It is anticipated that the hatchery will need to operate as a broodstock facility for more than 20 years due to the severely compromised status of coho salmon south of the Golden Gate. Under current conditions, this broodstock operation is likely the key reason coho salmon continue to persist in the Santa Cruz Diversity Stratum. Efforts should be expended to assist the MBSTP to obtain secure funding sources to ensure long term operation of the facility. Currently funding sources to operate this facility are not secure, much of the current funding comes from donations which have decreased in recent years due to decreased angling opportunities in local streams.
ScC-CCC-10.1.2.2	Action Step	Viability	Expand the Kingfisher Flat Hatchery.	1	5	Big Creek Lumber Co., CDFG, Monterey Bay Salmon and Trout Project, NOAA SWFSC, Pacific States Marine Fisheries Commission	600					600	Expansion by replacing the existing concrete raceways with numerous individual rearing tanks should be evaluated. This could increase operational flexibility for the Scott Creek population and populations in other watersheds. Expansion should only occur if water supply reliability, in quantity and quality, can be reasonably ensured.
ScC-CCC-10.1.3	Recovery Action	Viability	Increase spawner density										
ScC-CCC-10.1.3.1	Action Step	Viability	Conduct periodic, standardized spawning surveys to estimate adult abundance in the watershed. Surveys should include all three cohorts.	3	20		28.00	28.00	28.00	28.00		112	Standardized surveys should not occur until 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. 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 Mtns Diversity Stratum. Cost for spawner surveys are estimated at $56,470/year.
ScC-CCC-10.2	**Objective**	**Viability**	**Address the inadequacy of existing regulatory mechanisms**										
ScC-CCC-10.2.1	Recovery Action	Viability	Increase spatial structure and diversity										

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	
ScC-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 long-term survival and recovery for coho salmon and their habitat.	3	5	Big Creek Lumber Co., CalPoly, CDFG, Lockheed, NMFS	600					600	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.
ScC-CCC-10.2.1.2	Action Step	Viability	Continue ongoing juvenile sampling efforts in the watershed. Establish consistent reporting methods to ensure ESU-wide consistency.	2	10	Big Creek Lumber Co., CalPoly, NOAA SWFSC, Private Consultants	50.00	50.00				100	Juvenile monitoring is currently being conducted by J Smith of SJSU and to a lesser degree by the SWFSC.
ScC-CCC-10.2.1.3	Action Step	Viability	Initiate a new habitat typing effort in Scott Creek to guide future restoration actions.	1	2	Big Creek Lumber Co., CalPoly, CDFG, NOAA SWFSC	40.00					40	Information collected should be used to identify key areas for instream habitat restoration efforts and compare changes in stream conditions since the original habitat typing effort in the mid - 1990s.
ScC-CCC-13.1	**Objective**	**Channel Modification**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
ScC-CCC-13.1.1	Recovery Action	Channel Modification	Prevent impairment to instream substrate										
ScC-CCC-13.1.1.1	Action Step	Channel Modification	Evaluate whether proposed stabilization projects will lead to additional instability either up- or downstream.	3	100	California Coastal Conservancy, California Geological Survey, CalTrans, CDFG, FEMA, NMFS, NRCS, RWQCB, Santa Cruz County, Santa Cruz RCD, USACE, USFWS						0	This recommendation should be adopted as a standard business practice for all agencies and consulting firms involved in actions to address channel and bank stability.
ScC-CCC-13.1.1.2	Action Step	Channel Modification	Eliminate the use of gabion baskets and undersized rock within the bankfull channel.	3	100	CalTrans, CDFG, FEMA, NRCS, Santa Cruz County, Santa Cruz RCD, USACE						0	

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	
ScC-CCC-13.1.1.3	Action Step	Channel Modification	Promote bio-engineering solutions as appropriate (e.g. where critical infrastructure is located) for bank hardening projects.	3	100	California Coastal Conservancy, CalTrans, FEMA, NMFS, NRCS, RWQCB, Santa Cruz County, USACE							
ScC-CCC-13.1.1.4	Action Step	Channel Modification	Flood control projects or other modifications facilitating new development (as opposed to protecting existing infrastructure) should be avoided.	2	100	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, Lockheed, Santa Cruz County, USACE							
ScC-CCC-13.1.2	Recovery Action	Channel Modification	Prevent impairment to instream habitat complexity (reduced large wood and/or shelter)										
ScC-CCC-13.1.2.1	Action Step	Channel Modification	Minimize the use of rip-rap in future bank stabilization projects. Thoroughly evaluate all alternatives to rip-rap, and at a minimum, incorporate complexity features into stabilization projects.	3	100	Big Creek Lumber Co., CalPoly, NRCS, Santa Cruz County, USACE							
ScC-CCC-13.1.3	Recovery Action	Channel Modification	Prevent adverse alterations to riparian species composition and structure										
ScC-CCC-13.1.3.1	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 techniques to minimize habitat alteration effects.	3	100	CalFire, CalPoly, Caltrans, Santa Cruz County, Santa Cruz RCD, Scotts Creek Watershed Council, USACE							
ScC-CCC-13.2	**Objective**	**Channel Modification**	**Address the inadequacy of existing regulatory mechanisms**										
ScC-CCC-13.2.1	Recovery Action	Channel Modification	Prevent impairment to floodplain connectivity (impaired quality & extent)										

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	
ScC-CCC-13.2.1.1	Action Step	Channel Modification	Protect existing areas that provide winter refuge and seasonal habitats for juvenile salmonids from channelization projects.	1	100	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, CDFG, Santa Cruz County, Scotts Creek Watershed Council, USACE							Stream channels in Scott Creek have been modified through three methods: (1) channel straightening and levee construction, (2) removal of instream structure, and (3) bank stabilization to protect roads. These actions have impaired floodplain connectivity in some stream reaches. Remaining areas should be protected.
ScC-CCC-15.1	**Objective**	**Fire/Fuel Management**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
ScC-CCC-15.1.1	Recovery Action	Fire/Fuel Management	Prevent impairment to instream substrate/food productivity										
ScC-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						TBD	This recommendation should be considered a standard practice. 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. Methods should include out-sloping, waterbars, breaks in fire lines (pick up blades on dozers occasionally, especially where fuels are sparse), minimize gradient of fire lines, change fire-line alignment onto occasional flats as often as possible (and especially near watercourses) to allow flows to dissipate and settle sediment. To the maximum extent possible, maintain natural topography - eliminate concentrating water velocities.
ScC-CCC-15.1.1.2	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)						Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25	Entire Duration	
ScC-CCC-15.1.1.3	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						In-Kind	Some areas in the Scott Creek watershed have a high fire hazard rating according to CalFire data. A major fire occurred in the watershed in 2009. While fuel loading has been reduced following the 2009 fire, future wildfires are probable. A major fire, particularly if located in areas with a high erosion hazard rating, could substantially increase fine sediment input and further compromise the altered rate of large wood recruitment into stream channels. Furthermore, if existing riparian areas were lost to fire, higher instream temperatures would likely result.
ScC-CCC-15.2	**Objective**	**Fire/Fuel Management**	**Address the inadequacy of existing regulatory mechanisms**										
ScC-CCC-15.2.1	Recovery Action	Fire/Fuel Management	Prevent impairment to water quality										
ScC-CCC-15.2.1.1	Action Step	Fire/Fuel Management	Avoid use of aerial fire retardants and foams within 300 feet of riparian areas throughout the current range of CCC coho salmon.	1	100	CalFire							
ScC-CCC-15.2.1.2	Action Step	Fire/Fuel Management	Encourage CalFire to provide plan to all non-County firefighters when providing firefighting assistance in the Scott Creek watershed (and all other watersheds in the County).	1	5	CalFire						In-Kind	Cost of providing the plan is minimal.
ScC-CCC-15.2.1.3	Action Step	Fire/Fuel Management	In the event of a wildfire, CalFire Resource Advisors should contact the resource agencies for ESA consultation (or technical assistance) about the incident.	3	100	CalFire						In-Kind	The resource agencies can provide guidance regarding critical resources in the area that may be affected by the fire and firefighting actions.
ScC-CCC-15.2.2	Recovery Action	Fire/Fuel Management	Prevent impairment to hydrology										
ScC-CCC-15.2.2.1	Action Step	Fire/Fuel Management	Draft water from non-fish bearing waters if at all possible. In larger fish-bearing streams, excavate active channel areas outside of wetted width to create off-stream pools for water source.	2	100	CalFire							Avoid drafting water by helicopter from the Scotts Creek lagoon and obtain water from the nearby Pacific Ocean. Require all water truck/tenders be fitted with DFG 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.
ScC-CCC-16.1	**Objective**	**Fishing/Collecting**	**Address the inadequacy of existing regulatory mechanisms**										
ScC-CCC-16.1.1	Recovery Action	Fishing/Collecting	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)						Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25	Entire Duration	
ScC-CCC-16.1.1.1	Action Step	Fishing/Collecting	Install/construct permanent signs at all major public access points along Scotts Creek that clearly identify differences in body morphology of all potentially present adult salmonids with color photos (e.g., caudal fin spotting, caudal fork shape, coloration of lower jaw, peduncle width, etc.).	1	5	CDFG, Santa Cruz County, Scotts Creek Watershed Council	38.00					38	Cost of signs varies widely. Assume $500/sign with a minimum of 15 signs.
ScC-CCC-16.1.1.2	Action Step	Fishing/Collecting	Promote CalTip to discourage poaching (CDFG 2004).	2	100	CDFG							
ScC-CCC-16.1.1.3	Action Step	Fishing/Collecting	Prohibit offshore salmon fishing until January 15 (or until sandbar opens naturally) within one mile of the river mouth.	2	20	CDFG							
ScC-CCC-16.1.1.4	Action Step	Fishing/Collecting	Work with CDFG to improve the Fishing Regulation manual to clearly identify differences in body morphology of all potentially present adult salmonids with color photos of diagnostic features (e.g., caudal fin spotting, caudal fin shape, coloration of lower jaw, peduncle width, etc.).	1	3	CDFG, NMFS							
ScC-CCC-16.1.1.5	Action Step	Fishing/Collecting	Work with CDFG to modify Section 8.00 (b) (1) low flow minimum flow closure for Scotts Creek.	1	10	CDFG, NMFS						In-Kind	Low flow closures should take priority over a fishing start date. Low flow closure should be based on flow conditions from a nearby watershed (e.g., the San Lorenzo River) in the coastal Santa Cruz Mountains. If capture of hatchery steelhead is sanctioned by DFG for Scott Creek, it is anticipated increased fishing pressure will likely occur and intercept of CCC coho salmon will also occur. If steelhead capture is authorized by DFG the fishing start date for Scott Creek should be pushed back until at least Jan 15th.
ScC-CCC-19.1	**Objective**	**Logging**	**Address the present or threatened destruction, modification or curtailment of the species habitat or range**										
ScC-CCC-19.1.1	Recovery Action	Logging	Prevent impairment to floodplain connectivity (impaired quality & extent)										
ScC-CCC-19.1.1.1	Action Step	Logging	Timber harvest planning should evaluate and avoid or minimize impacts to off channel habitat, floodplains, ponds, and oxbows.	2	100	Big Creek Lumber Co., CalFire, CalPoly							
ScC-CCC-19.1.2	Recovery Action	Logging	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)						Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25	Entire Duration	
ScC-CCC-19.1.2.1	Action Step	Logging	Evaluate road surface treatment options to halt or minimize impacts from water drafting and diversion during droughts and summer low flow periods.	3	100	Big Creek Lumber Co., CalFire, CalPoly							Temporary road surface treatments such as Dope30 should be evaluated.
ScC-CCC-19.1.3	Recovery Action	Logging	Prevent impairment to instream habitat complexity (reduced large wood and/or shelter)										
ScC-CCC-19.1.3.1	Action Step	Logging	Retain the largest trees in all riparian zones (including intermittent and ephemeral streams) for bank stability and long-term wood recruitment.	2	100	Big Creek Lumber Co., CalFire, CalPoly, CDFG						In-Kind	Logging is a potential future threat to summer rearing juveniles due to the potential of timber management to reduce future recruitment of LWD into stream channels and increase instream temperatures. California Forest Practice Rules require retention of riparian trees adjacent to Class 1 fish bearing streams, which will ameliorate the impacts of reduced LWD and overstory canopy reduction. Santa Cruz County rules do not allow even aged management.
ScC-CCC-19.1.4	Recovery Action	Logging	Prevent alterations to sediment transport (road condition/density, dams, etc.)										
ScC-CCC-19.1.4.1	Action Step	Logging	Avoid the new road construction in riparian zones (< 100 feet).	2	100	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, Santa Cruz County							
ScC-CCC-19.2	**Objective**	**Logging**	**Address the inadequacy of existing regulatory mechanisms.**										
ScC-CCC-19.2.1	Recovery Action	Logging	Prevent increased landscape disturbance										
ScC-CCC-19.2.1.1	Action Step	Logging	Review "fire-safe" exemptions to prevent illegal conversions, riparian corridor impacts and other watershed impacts.	2	100	CalFire, Santa Cruz County						In-Kind	Applications are currently approved without review.
ScC-CCC-23.1	**Objective**	**Roads/Railroads**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
ScC-CCC-23.1.1	Recovery Action	Roads/Railroads	Prevent impairment to instream substrate										

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	
ScC-CCC-23.1.1.1	Action Step	Roads/Railroads	Maintain adequate energy dissipators for culverts and other drainage pipe outlets where needed.	2	10	Big Creek Lumber Co., CalFire, CalPoly, RWQCB, Santa Cruz County Department of Public Works	13.50	13.50				27	Cost for a road inventory of 26 miles of road estimated at $1,056/mile. Number of culverts and feasibility of energy dissipaters should be identified from road assessment.
ScC-CCC-23.1.1.2	Action Step	Roads/Railroads	Extend the monitoring period and upgrade THP road maintenance after harvest.	3	100	CalFire, CDFG, RWQCB						In-Kind	
ScC-CCC-23.1.1.3	Action Step	Roads/Railroads	Decommission riparian road systems and/or upgrade roads (and skid trails on forestlands) that deliver sediment into adjacent watercourses (CDFG 2004).	3	10	Big Creek Lumber Co., CalFire, Lockheed, Scotts Valley Water District	11.00	11.00				22	This is a long term plan that would require cooperation from the majority of the landowners in the watershed. It is unknown if this is a feasible alternative for Scott Creek. Primary emphasis should be placed on removing riparian roads with high sediment delivery potential adjacent to key spawning and rearing areas. 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 $13,680/mile to decommission 1.5 miles of riparian roads.
ScC-CCC-23.1.2	Recovery Action	Roads/Railroads	Prevent impairment to the estuary										
ScC-CCC-23.1.2.1	Action Step	Roads/Railroads	Relocate or extend the proposed replacement bridge for Highway 1 over Scott Creek in order to allow Scott Creek to re-establish its historical outlet into the ocean. Relocating or extending the replacement bridge could facilitate the re-establishment of the historical tidal prism in the lower lagoon.	1	10	CalPoly, CalTrans, CDFG, NMFS, Santa Cruz County						TBD	Increased costs may be associated with the proposed recommendation but this information is currently unavailable. This is a very rare opportunity to re-establish an estuary to historical conditions. This is also an opportunity to proactively address impacts of sea level rise so as to not further impair the estuary with additional bank stabilization features and channelizing. See ESTUARY for more information.
ScC-CCC-23.1.3	Recovery Action	Roads/Railroads	Prevent impairment to watershed hydrology										
ScC-CCC-23.1.3.1	Action Step	Roads/Railroads	Size culverts to accommodate flashy, debris-laden flows and maintain trash racks to prevent culvert plugging and subsequent road failure.	3	10	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, Santa Cruz County	215.50	215.50				431	Cost based on $71,820/unit for 6 identified stream crossings.
ScC-CCC-23.2	**Objective**	**Roads/Railroads**	**Address the inadequacy of existing regulatory mechanism**										

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	
ScC-CCC-23.2.1	Recovery Action	Roads/Railroads	Prevent impairment to instream substrate										
ScC-CCC-23.2.1.1	Action Step	Roads/Railroads	Avoid new road construction within floodplains, riparian areas, unstable soils or other sensitive areas until a watershed specific and/or agency/company specific road management plan is created and implemented.	2	10	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, RWQCB, Santa Cruz County						In-Kind	Road densities are high throughout the watershed and are estimated at 4.1 miles of road per square mile of watershed area, and at 4.0 miles per square mile of riparian area. Many of these roads are poorly situated, unpaved, and are sources of chronic sediment input. Paved and unpaved roads parallel many of the waterways within Scotts Creek and impinge upon channel migration. Some roads in the watershed are used for timber harvest and receive heightened levels of maintenance and review, as least for a short time (currently three years) following completion of a timber harvest plan. A well designed road management plan should result in overall cost savings due to reduced flood fighting actions, and stream bank and road stabilization projects.
ScC-CCC-23.2.1.2	Action Step	Roads/Railroads	Conduct annual inspections of all roads prior to winter. Correct conditions that are likely to deliver sediment to streams. Hydrologically disconnect roads.	1	100	Big Creek Lumber Co., CalFire, CalPoly, Lockheed, Private Landowners, Santa Cruz County						In-Kind	This should be considered a standard road management practice for all landowners.
ScC-CCC-23.2.1.3	Action Step	Roads/Railroads	Licensed engineering geologists should review and approve grading on inner gorge slopes.	2	100	Big Creek Lumber Co., CalFire, California Geological Survey, CalPoly, RWQCB, Santa Cruz County						In-Kind	This is a cost that is frequently absorbed into new road projects and should be considered a standard business practice.
ScC-CCC-23.2.1.4	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).	1	100	Big Creek Lumber Co., CalFire, California Geological Survey, CalPoly, NRCS, Private Landowners, RPFs, RWQCB, Santa Cruz County, Santa Cruz RCD						TBD	These practices should be adopted as part of future road actions and maintenance practices.

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	
ScC-CCC-23.2.1.5	Action Step	Roads/Railroads	Limit winter use of unsurfaced roads and recreational trails by unauthorized and impacting uses to decrease fine sediment loads.	3	100	Big Creek Lumber Co., CalFire, Private Landowners						TBD	This recommendation may involve increased intra-watershed coordination among the landowners (locking and installing gates, etc.). Cost likely accounted for in road inventory.
ScC-CCC-23.2.1.6	Action Step	Roads/Railroads	Stream crossings should be identified and mapped with the intention of replacement or removal if they cannot pass 100 year flow. Design should include fail safe measures to accommodate culvert overflow without causing massive road fill failures.	2	40	Big Creek Lumber Co., CalFire, CalPoly, RWQCB, Santa Cruz County, USACE							
ScC-CCC-23.2.1.7	Action Step	Roads/Railroads	Encourage appropriate restrictions for winter use of unsurfaced roads along rural utility easements; and establish best management practices for clearance within riparian corridors.	2	100	CalFire, PG&E, Santa Cruz County						In-Kind	
ScC-CCC-24.1	**Objective**	**Severe Weather Patterns**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
ScC-CCC-24.1.1	Recovery Action	Severe Weather Patterns	Prevent impairment to the estuary										
ScC-CCC-24.1.1.1	Action Step	Severe Weather Patterns	Work with water users to minimize depletion of summer base flows.	1	100	Big Creek Lumber Co., CalPoly, Lockheed, Private Landowners, Scotts Creek Watershed Council, SWRCB							Bypass flows at the Mill Creek dam should be the first area of focus, particularly during dry water years.
ScC-CCC-24.1.1.2	Action Step	Severe Weather Patterns	Design estuary restoration projects to include subtidal habitats and natural bioengineering techniques that buffer wave action and increase sediment deposition to minimize shoreline and wetland erosion.	2	20	CalPoly, CalTrans, IWRP, USACE							Cost accounted for in ESTUARY.
ScC-CCC-24.1.2	Recovery Action	Severe Weather Patterns	Prevent impairment to hydrology										
ScC-CCC-24.1.2.1	Action Step	Severe Weather Patterns	Implement water conservation strategies that provide for drought contingencies without relying on interception of surface flows or groundwater depletion.	2	100	Big Creek Lumber Co., CalPoly, Lockheed, 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	
ScC-CCC-24.1.2.2	Action Step	Severe Weather Patterns	If predicted flows are below a level considered critical to maintain habitat conditions for coho salmon, measures to reduce water consumption should be initiated by users in the watershed through conservation programs.	1	10	Big Creek Lumber Co., CalPoly, CDFG, NMFS, Private Landowners, SWRCB	36.00	36.00				72	Cost for stream flow model estimated at $71,825/project.
ScC-CCC-24.1.2.3	Action Step	Severe Weather Patterns	Pursue opportunities to acquire or lease water, or acquire water rights from willing sellers, for coho salmon recovery purposes. Develop incentives for water right holders to dedicate instream flows for the protection of coho salmon (CDFG 2004)(Water Code § 1707).	3	100	California Coastal Conservancy, CalPoly, Lockheed, NRCS						TBD	The price water is sold on environmental markets is determined by negotiations between landowners and purchasing entity. In circumstances where potential agricultural sellers of water rights do not shift to groundwater pumping or make other arrangements such that lands are not left fallow, potential sellers may forgo the agricultural profits they would have gained from irrigating. Cost will vary depending on water availability and landowner participation. It is unknown if this program will gain widespread acceptance in the watershed and therefore costs cannot be estimated. However, it is recommended that the equations used in the State Coho Plan for socioeconomic costs be utilized when more information regarding landowner participation is gathered. Water Acquisitions are estimated to range between $87 - 650/acre-foot.
ScC-CCC-24.1.2.4	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.	3	100	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, FEMA, NRCS, Santa Cruz County, Santa Cruz RCD, USACE							Costs will vary significantly depending on site specific conditions and landowner willingness to have roads and other infrastructure addressed to improve hydrologic function. Due to relative paucity of infrastructure and the high percentage of roads regulated by the CFPR's this recommendation is a lower priority in Scott Creek than in other coastal watersheds.
ScC-CCC-24.2	**Objective**	**Severe Weather Patterns**	**Address the inadequacy of existing regulatory mechanisms**										
ScC-CCC-24.2.1	Recovery Action	Severe Weather Patterns	Prevent impairment to instream habitat complexity (reduced large wood and/or shelter)										

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	
ScC-CCC-24.2.1.1	Action Step	Severe Weather Patterns	Work with local governments to incorporate protection of CCC coho salmon in any flood management activity (CDFG 2004).	1	100	Big Creek Lumber Co., CalPoly, CDFG, FEMA, Private Landowners, Santa Cruz County, Scotts Creek Watershed Council, USACE						In-Kind	According to Stillwater Sciences et al. (2010), California coastal streams do not naturally have channel morphology conducive to forming extensive flood plains or off-channel rearing areas. This is particularly true in the streams in the Santa Cruz Mountains, which contain little of the low-gradient, wide-valley streams that provide productive rearing habitat for salmonids. Thus, the role of large wood in these steeper streams was, in all likelihood, absolutely essential for providing refuge habitat during high flow events in winter, because there were fewer opportunities for off-channel habitat refuges (Moyle et al., 2008). Therefore LWD is an even more critical habitat element than in more northern streams to form pools or areas of refuge from high flows. Wood in the past was frequently cut up in Scotts Creek due to fears by some landowners that it will lead to increased flooding and property damage. These practices adversely affect the summer and winter rearing lifestages. Low LWD abundance in the lower portion of Scotts Creek is likely the result of past logging practices that removed trees from riparian areas, followed by Santa Cruz County funded stream clearance efforts following the 1982 flood. Santa Cruz County has essentially stopped removing LWD since 2009. Low instream LWD volume is likely the major contributor to the lower shelter values estimated in the watershed; only 20 percent of stream reaches had a shelter value >80, which constituted less than three percent of available IP. Maintaining wood is essential to improving habitat conditions and should be a major consideration for future flood management actions.
ScC-CCC-24.2.2	Recovery Action	Severe Weather Patterns	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										
ScC-CCC-24.2.2.1	Action Step	Severe Weather Patterns	Protect high-risk shallow-seated landslide areas and surfaces prone to erosion from being mobilized by intense storm events.	3	10	Big Creek Lumber Co., CalFire, CalPoly, Santa Cruz County	33.00	33.00				66	Extreme flood events such as those that occurred in 1955 and 1982 could result in major sediment input from upslope locations. Changes and improvements to land-use practices (i.e., avoiding road construction at the toe of a landslide) will likely result in lower sediment yields following future flooding events than were likely experienced after the 1955 and 1982 floods. However, future severe weather events could slow the rate of recovery of instream habitat conditions. Cost for erosion assessment estimated at $13.90/acre. (assume 25% of total watershed acres).

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ScC-CCC-24.2.3	Recovery Action	Severe Weather Patterns	Prevent impairment to floodplain connectivity (impaired quality & extent)										
ScC-CCC-24.2.3.1	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.	2	100	FEMA, NRCS, RWQCB, Santa Cruz County, USACE						In-Kind	Avoiding building in channel migration zones can result in long term cost saving due to reduced flood fighting and consequent stabilization measures.
ScC-CCC-24.2.3.2	Action Step	Severe Weather Patterns	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	100	FEMA, Private Landowners, Santa Cruz County, USACE							Some infrastructure may be relatively easy to remove while other infrastructure will be extremely difficult. This recommendation should be viewed as an opportunistic strategy in Scott Creek.
ScC-CCC-24.2.4	Recovery Action	Severe Weather Patterns	Prevent impairment to stream hydrology (impaired water flow)										
ScC-CCC-24.2.4.1	Action Step	Severe Weather Patterns	Establish and enforce minimum summer releases from the Mill Creek reservoir to ensure rearing habitat is maintained in Mill Creek.	1	5	CDFG, Lockheed, NMFS, SWRCB	45.00					45	This important coho salmon rearing stream dried down to isolated pools during the drought years of 1988, 2007, and 2008. A contingency plan should also be developed to provide a pulse release from the reservoir in drought years to facilitate adult entry (for broodstock capture for the hatchery) as well as for wild spawning.
ScC-CCC-24.2.4.2	Action Step	Severe Weather Patterns	Agencies and landowners should develop contingencies for drought conditions in a manner compatible with CCC coho salmon recovery needs.	2	10	Big Creek Lumber Co., CalFire, CalPoly, CDFG, Monterey Bay Salmon and Trout Project, NMFS, Santa Cruz County, Scotts Creek Watershed Council, SWRCB	20.00	20.00				40	Impacts of a severe drought in conjunction with ongoing water diversion could affect all lifestages of coho in the watershed. A severe drought could reduce total water yield and delay or limit adult coho migration to spawning areas; reduce juvenile rearing habitat; and expose winter rearing, summer rearing, and smolt coho to increased predation. Work with DFG, SWRCB, Scotts Creek Watershed Council, and knowledgeable biologist to develop emergency rules and adopt implementation agreements. Emergency rules should be sure to include diversions in upper Mill Creek where contingency emergency releases should be addressed to provide for adult passage in drought year (this would at least allow adult coho salmon to enter the stream where they could be captured broodstock for the Kingfisher Flat Restoration Hatchery.

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ScC-CCC-24.2.4.3	Action Step	Severe Weather Patterns	CDFG, SWRCB, RWQCB, CalFire, and other agencies and landowners, in cooperation with NMFS, should evaluate the rate and volume of water drafting for dust control in streams or tributaries and where appropriate, minimize water withdrawals that could impact coho salmon. These agencies should consider existing regulations or other mechanisms when evaluating alternatives to water as a dust palliative (including EPA-certified compounds) that are consistent with maintaining or improving water quality (CDFG 2004).	3	10	Big Creek Lumber Co., CalPoly, CDFG, NMFS, RWQCB, SWRCB						In-Kind	
ScC-CCC-24.2.4.4	Action Step	Severe Weather Patterns	Encourage SWRCB to bring illegal water diverters and out-of-compliance diverters into compliance with State law.	3	100	CDFG, NMFS, Scotts Creek Watershed Council, SWRCB							
ScC-CCC-24.2.4.5	Action Step	Severe Weather Patterns	Improve coordination between agencies and others to address season of diversion, off-stream reservoirs, bypass flows protective of coho salmon and their habitats, and avoidance of adverse impacts caused by water diversion (CDFG 2004).	2	50	CDFG, NMFS, SWRCB						In-Kind	
ScC-CCC-24.2.4.6	Action Step	Severe Weather Patterns	Encourage CalFire to modify water right for diversion in upper headwaters of Scott Creek.			CalFire, CDFG, NMFS, SWRCB							
ScC-CCC-24.2.4.7	Action Step	Severe Weather Patterns	Evaluate dam and impact of water diversions in Boyer Creek (trib to Big Cr)	3	5	CDFG, NMFS, Private Landowners, SWRCB							
ScC-CCC-24.3	**Objective**	**Severe Weather Patterns**	**Address other natural or manmade factors affecting the species' continued existence**										
ScC-CCC-24.3.1	Recovery Action	Severe Weather Patterns	Prevent impairment to passage and migration										

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ScC-CCC-24.3.1.1	Action Step	Severe Weather Patterns	Evaluate and prepare contingency plans to breach estuary sandbars to facilitate adult upmigration when instream flows are adequate for passage and spawning IF sandbar remains closed by mid-January and conservation hatchery remains in operation.	2	5	CA Coastal Commission, CDFG, Monterey Bay Salmon and Trout Project, NMFS, NOAA SWFSC, RWQCB, Santa Cruz County, Scotts Creek Watershed Council, State Parks, USACE, USFWS	20.00					20	This option is likely most viable in Scott Creek due to the Kingfisher Flat Hatchery and the importance of obtaining CCC coho for the current Broodstock program. This recommendation must be viewed with extreme caution in other watersheds. This recommendation should only be implemented in close cooperation with the NOAA SWFSC, USFWS, MBSTP, DFG, and land owners. Permitting issues should be worked out well in advance by the regulatory agencies.
ScC-CCC-24.4	**Objective**	**Severe Weather Patterns**	**Address the overutilization for commercial, recreational, scientific or educational purposes**										
ScC-CCC-24.4.1	Recovery Action	Severe Weather Patterns	Prevent reduced density, abundance, and diversity										
ScC-CCC-24.4.1.1	Action Step	Severe Weather Patterns	Increase enforcement patrols by CDFG and NMFS OLE in sensitive spawning and rearing areas.	2	100	CDFG Law Enforcement, NMFS OLE						In-Kind	Costs are expected to be absorbed into ongoing activities.