Salmon Creek

Location	•Sonoma County
Watershed Area	•35.0 Square Miles
Potential Habitat	•35.9 Stream Miles
Vegetation	•42% Coniferous or Montane Forest, 42% Grassland
Erodability	•Low to Moderate
Ownership Patterns	•99% Private
Dominant Land Uses	•Ranching
Housing Density	•Low
TMDL Pollutants	•None

Salmon Creek
Photo by Michael Fawcett

Salmon Creek Coho Salmon: Nearly Extirpated

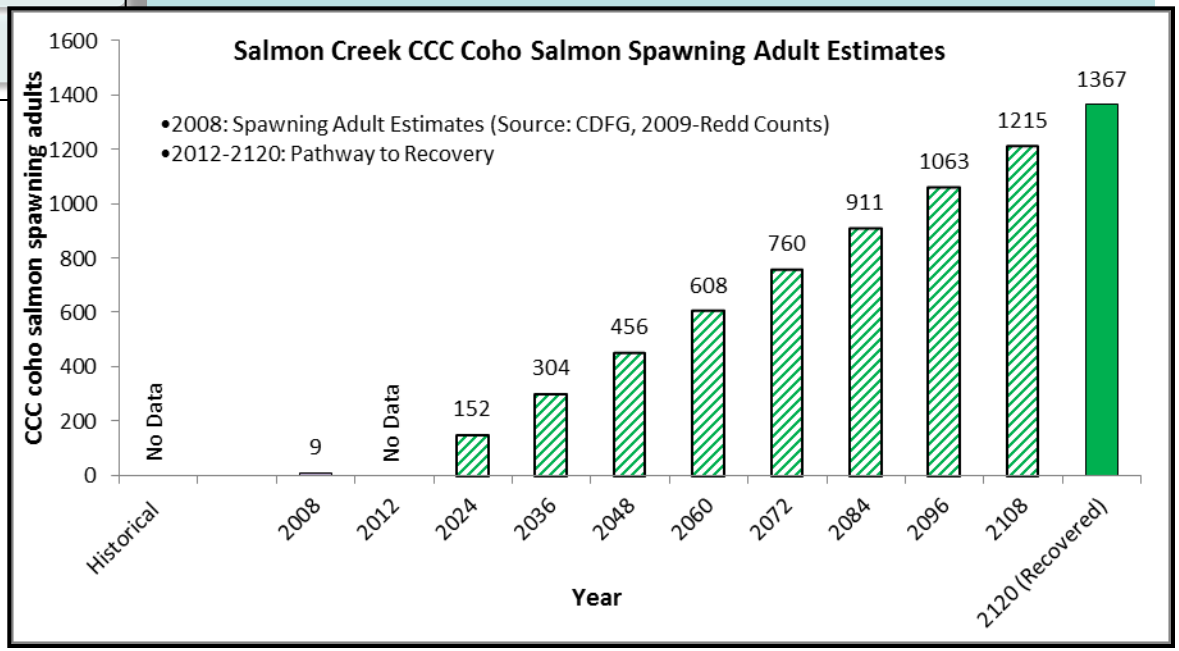
Recovery Goals

- ✓ Continue the operation of the Captive Broodstock Program in Salmon Creek
- ✓ Conduct monitoring to track population response to recovery action implementation

Salmon Creek
Adult Spawner Targets

Downlisting to Threatened
684

Recovery
1,367



STEELHEAD: YES
CHINOOK SALMON: NO

Salmon Creek

Potential Habitat: 35.9 miles
Recovery Target: 1,367 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
POOR	POOR	FAIR	GOOD	POOR	FAIR	FAIR	FAIR	FAIR	POOR	GOOD

Preventing Extinction & Improving Conditions

Priority 1: Immediate Restoration Actions

- Establish a more natural hydrograph, by-pass flows, seasons of diversion, and off stream storage
- Develop cooperative projects with private landowners to conserve summer flows
- Use surplus broodstock to repopulate remaining extirpated streams within the watershed
- Annually capture or retain (during rescue efforts) - small numbers of surplus fish from drying streams/habitats for purposes of broodstock in Salmon Creek

Priority 2 & 3: Long-Term Restoration Actions

- Implement the Salmon Creek Enhancement Plan by regaining as much of the historical capacity and area of the Salmon Creek Estuary as possible
- Restore estuarine wetlands and sloughs
- Avoid new development within riparian zones and the 100 year floodprone zones
- Investigate the feasibility of beaver re-location and re-introductions to promote channel complexity, improve baseflows and provide rearing habitat
- Support the water conservation training conducted by the Occidental Arts and Ecology Center Water Institute, Gold Ridge RCD, and Salmon Creek Watershed Council.

Recovery Partners

Gold Ridge RCD

Photo courtesy from left to right: Josh Fuller, NMFS, Campbell Timberland, Campbell Timberland, Eli Asarian and Morgan Bond, SWFSC

Salmon Creek

Potential Habitat: 35.9 miles
Recovery Target: 1,367 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	LOW	LOW	LOW	HIGH	HIGH	N/A	N/A	HIGH	HIGH	HIGH	HIGH

Reducing Future Threats

Priority 1: Immediate Threat Abatement Actions

- Encourage riparian restoration to regain riparian corridors damaged from livestock and other causes
- Promote off-channel storage to reduce impacts of water diversion
- Minimize water use and seek alternatives during droughts

Priority 2 & 3: Long-Term Threat Abatement Actions

- Implement Best Management Practices such as those in the Fish Friendly Farming program (California Land Stewardship Institute), or other cooperative conservation programs.
- Aid landowners willing to fence off riparian areas with development of offstream alternative water sources
- Develop and enforce riparian setbacks/buffers
- Identify and remediate upstream pollution sources which contribute to poor water quality conditions in the estuary
- Implement results of existing sediment source surveys, and assess remaining watershed road networks to eliminate high priority and high sediment sources.

Michael Fawcett and Jennifer Michaud monitoring Salmon Creek *Photo by Dan Logan, NMFS*

Conservation Highlights

- Salmon Creek was selected as a location for conservation hatchery out planting of coho salmon progeny.

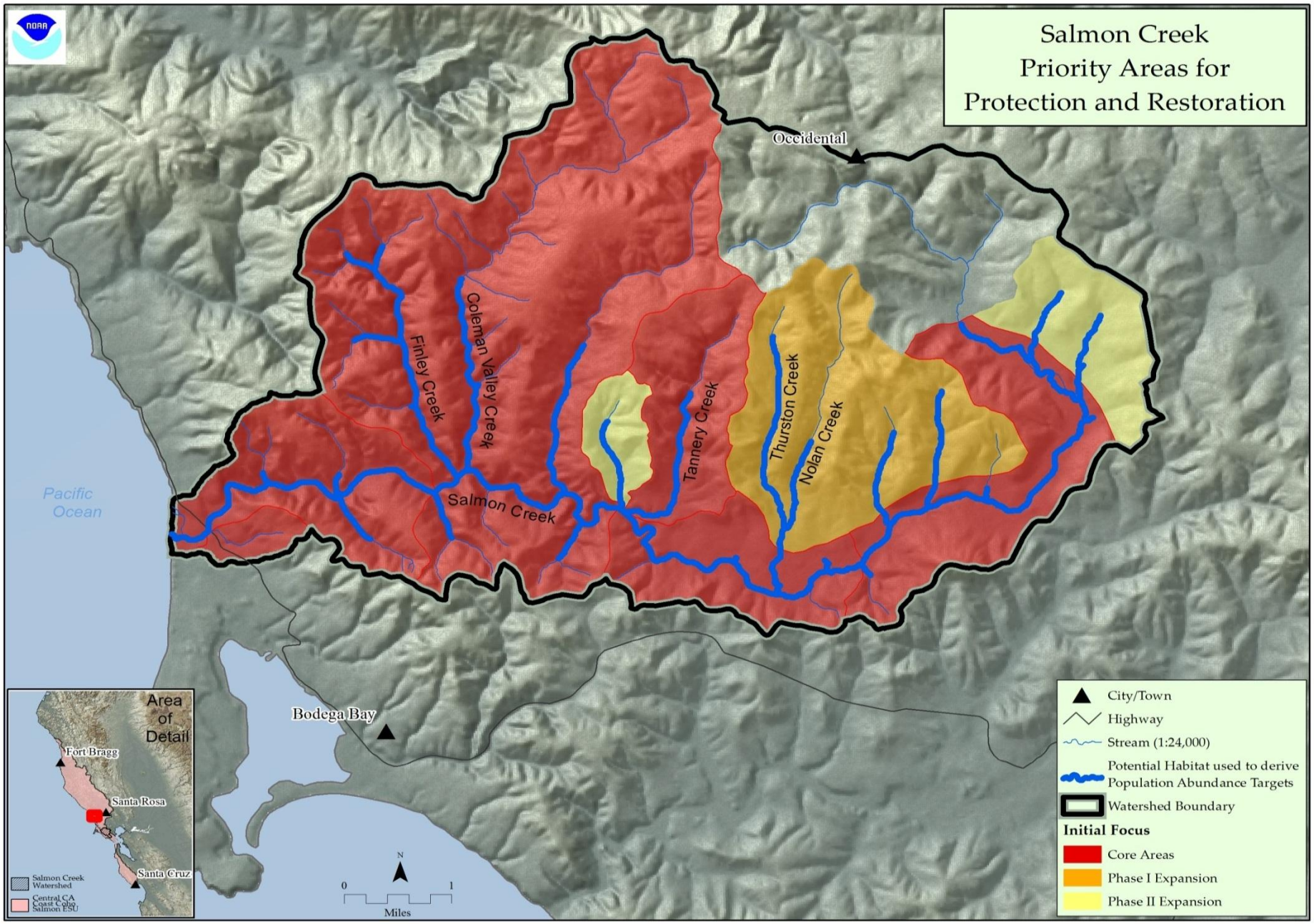


Figure 1: Map of Salmon Creek

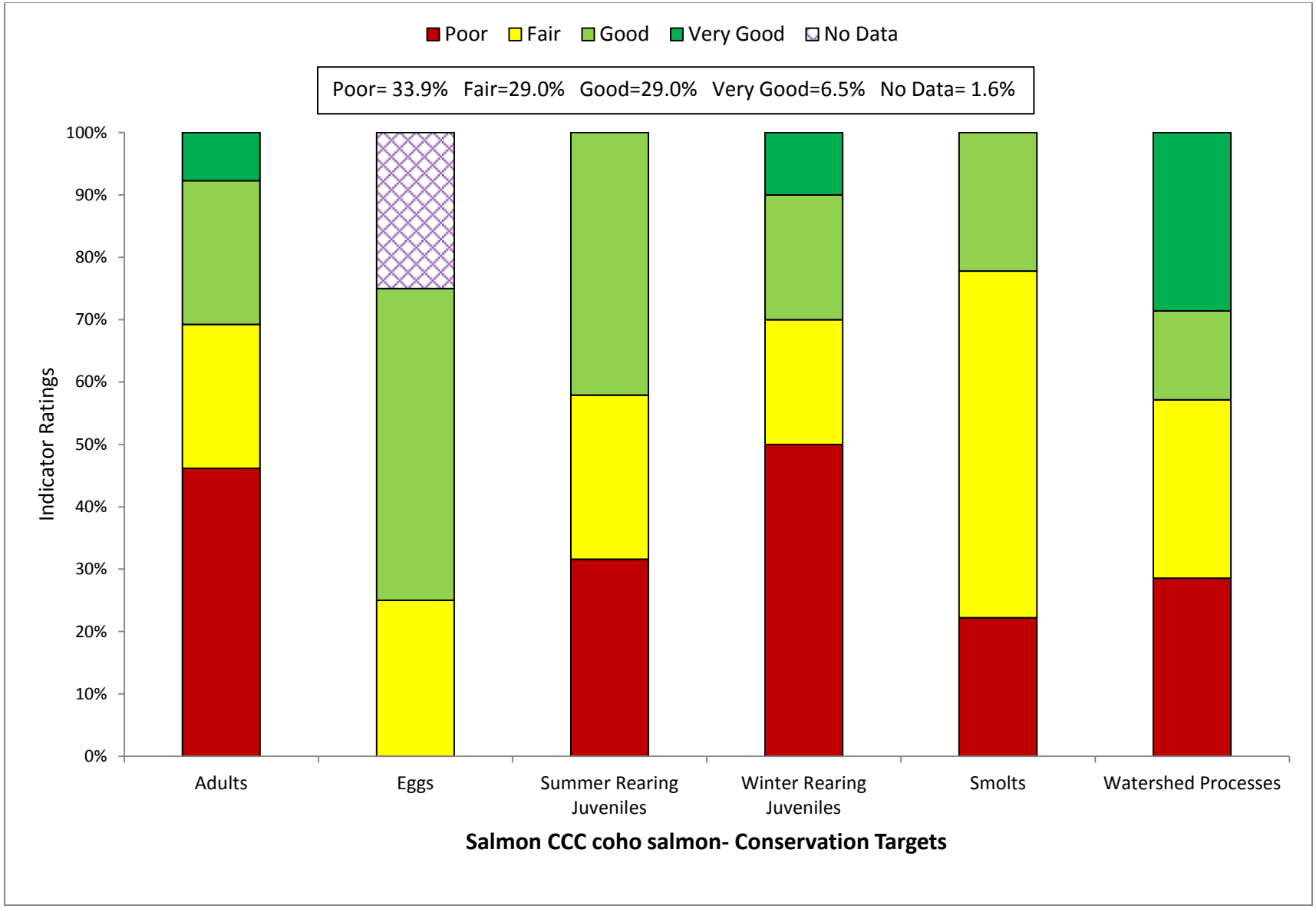


Figure 2: Viability Results by Lifestage

Table 1: CAP Viability Results ~ Salmon Creek

Target	Attribute	Indicator	Result	Rating	Method	Desired Criteria
Adults	Habitat Complexity	Large Wood Frequency (BFW 0-10 meters)	**0.06 Key Pieces/100m**	Poor	NMFS Expert Estuary/Lagoon Panel	6 to 11 key pcs/100m
Adults	Habitat Complexity	Large Wood Frequency (BFW 10-100 meters)	**<1 Key Pieces/100m**	Poor	NMFS Expert Estuary/Lagoon Panel	1.3 to 4 Key Pieces/100 meters
Adults	Habitat Complexity	Pool/Riffle/Flatwater Ratio	**14% streams; 59% IP-km (>30% Pools; >20% Riffles)**	Fair	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Adults	Habitat Complexity	Shelter Rating	**0% of streams/ IP-km (>80 stream average)**	Poor	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km (>80 stream average)
Adults	Hydrology	Passage Flows	**Risk Factor Score =58**	Fair	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	**>90% of IP-km accessible**	Very Good	SEC Analysis/CDFG Data	75% of IP-Km to 90% of IP-km
Adults	Riparian Vegetation	Tree Diameter (North of SF Bay)	**30% Class 5 & 6 across IP-km**	Poor	SEC Analysis/CDFG Data	55 - 69% Class 5 & 6 across IP-km
Adults	Riparian Vegetation	Tree Diameter (South of SF Bay)	**na**	0	SEC Analysis/CDFG Data	≥80% Density rating "D" across IP-km
Adults	Sediment	Quantity & Distribution of Spawning Gravels	**75% of IP-km to 90% of IP-km accessible**	Good	SEC Analysis/CDFG Data	75% of IP-Km to 90% of IP-km
Adults	Velocity Refuge	Floodplain Connectivity	**50-80% Response Reach Connectivity**	Fair	SEC Analysis/CDFG Data	>80% Response Reach Connectivity
Adults	Water Quality	Toxicity	**No Acute or Chronic**	Good	SEC Analysis/CDFG Data	No Acute or Chronic
Adults	Water Quality	Turbidity	**<50% of streams/ IP-km maintains severity score of 3 or lower**	Poor	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower
Adults	Viability	Density	**<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 =42**	Good	SEC Analysis/CDFG Data	NMFS Flow Protocol: Risk Factor Score 35-50
Eggs	Hydrology	Redd Scour	**Risck Factor Score =58**	Fair	SEC Analysis/CDFG Data	NMFS Flow Protocol: Risk Factor Score 35-50

Eggs	Sediment	Gravel Quality (Bulk)	**ND**	0	NMFS Instream Flow Analysis	12-14% (0.85mm) and <30% (6.4mm)
Eggs	Sediment	Gravel Quality (Embeddedness)	**71% streams; 88% IP-km (>50% stream average scores of 1 & 2)**	Good	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/non-functional**	Poor	NMFS Instream Flow Analysis	Properly Functioning Condition
Summer Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 0-10 meters)	**0.06 Key Pieces/100m**	Poor	NMFS Instream Flow Analysis	6 to 11 key pcs/100m
Summer Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 meters)	**<1 Key Pieces/100m**	Poor	NMFS Instream Flow Analysis	1.3 to 4 Key Pieces/100 meters
Summer Rearing Juveniles	Habitat Complexity	Percent Primary Pools	**86% IP-km; streams 91% 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	**14% streams; 59% IP-km (>30% Pools; >20% Riffles)**	Fair	NMFS Instream Flow Analysis	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Summer Rearing Juveniles	Habitat Complexity	Shelter Rating	**0% of streams/ IP-km (>80 stream average)**	Poor	NMFS Instream Flow Analysis	75% to 90% of streams/ IP-Km (>80 stream average)
Summer Rearing Juveniles	Hydrology	Flow Conditions (Baseflow)	**Risk Factor Score =67**	Fair	NMFS Instream Flow Analysis	NMFS Flow Protocol: Risk Factor Score 35-50
Summer Rearing Juveniles	Hydrology	Flow Conditions (Instantaneous Condition)	**Risk Factor Score =50**	Good	NMFS Watershed Characterization	NMFS Flow Protocol: Risk Factor Score 35-50
Summer Rearing Juveniles	Hydrology	Number, Condition and/or Magnitude of Diversions	**2.41 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	**100% of IP-km accessible**	Good	Population Profile/BPJ	75% of IP-Km to 90% of IP-km
Summer Rearing Juveniles	Riparian Vegetation	Canopy Cover	**50% to 74% of streams/ IP-km (>85% average stream canopy)**	Fair	SEC or PAD/CDFG Data	75% to 90% of streams/ IP-Km (>85% average stream canopy)
Summer Rearing Juveniles	Riparian Vegetation	Tree Diameter (North of SF Bay)	**30% Class 5 & 6 across IP-km**	Poor	Population Profile/BPJ	55 - 69% Class 5 & 6 across IP-km
Summer Rearing Juveniles	Riparian Vegetation	Tree Diameter (South of SF Bay)	**na**	0	SEC or PAD/CDFG Data	≥80% Density rating "D" across IP-km
Summer Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	**71% streams; 88% IP-km (>50% stream average scores of 1 & 2)**	Good	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)	**50-74% IP-km (>6 and <14 C)**	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	**75-90% of Historical Range**	Good	NMFS Watershed Characterization/CWHR	75-90% of Historical Range
Winter Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 0-10 meters)	**0.06 Key Pieces/100m**	Poor	NMFS Watershed Characterization/CWHR	6 to 11 key pcs/100m
Winter Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 meters)	**<1 Key Pieces/100m**	Poor	NMFS Watershed Characterization/CWHR	1.3 to 4 Key Pieces/100 meters
Winter Rearing Juveniles	Habitat Complexity	Pool/Riffle/Flatwater Ratio	**14% streams; 59% IP-km (>30% Pools; >20% Riffles)**	Fair	NMFS Watershed Characterization/CWHR	75% to 90% of streams/ IP-Km (>30% Pools; >20% Riffles)
Winter Rearing Juveniles	Habitat Complexity	Shelter Rating	**0% of streams/ IP-km (>80 stream average)**	Poor	CDF Vegetation Maps/BPJ	75% to 90% of streams/ IP-Km (>80 stream average)
Winter Rearing Juveniles	Passage/Migration	Physical Barriers	**100% of IP-km accessible**	Very Good	Population Profile/BPJ	75% of IP-Km to 90% of IP-km
Winter Rearing Juveniles	Riparian Vegetation	Tree Diameter (North of SF Bay)	**30% Class 5 & 6 across IP-km**	Poor	Population Profile/BPJ	55 - 69% Class 5 & 6 across IP-km
Winter Rearing Juveniles	Riparian Vegetation	Tree Diameter (South of SF Bay)	**na**	0	SEC Analysis/CDFG Data	≥80% Density rating "D" across IP-km
Winter Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	**71% streams; 88% IP-km (>50% stream average scores of 1 & 2)**	Good	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2)
Winter Rearing Juveniles	Velocity Refuge	Floodplain Connectivity	**50-80% Response Reach Connectivity**	Fair	SEC Analysis/CDFG Data	>80% Response Reach Connectivity
Winter Rearing Juveniles	Water Quality	Toxicity	**No Acute or Chronic**	Good	NMFS Watershed Characterization	No Acute or Chronic
Winter Rearing Juveniles	Water Quality	Turbidity	**<50% of streams/ IP-km maintains severity score of 3 or lower**	Poor	NMFS Watershed Characterization	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower

Smolts	Estuary/Lagoon	Quality & Extent	**Impaired/non-functional**	Fair	SEC Analysis/CDFG Data	Properly Functioning Condition
Smolts	Habitat Complexity	Shelter Rating	**0% of streams/ IP-km (>80 stream average)**	Poor	Population Profile	75% to 90% of streams/ IP-Km (>80 stream average)
Smolts	Hydrology	Number, Condition and/or Magnitude of Diversions	**2.41 Diversions/10 IP-km**	Fair	Population Profile	0.01 - 1 Diversions/10 IP km
Smolts	Hydrology	Passage Flows	**75% of IP-km to 90% of IP-km accessible**	Good	TRT Spence (2008)	NMFS Flow Protocol: Risk Factor Score 35-50
Smolts	Passage/Migration	Passage at Mouth or Confluence	**Risk Factor Score =58**	Fair	TRT Spence (2008)	75% of IP-Km to 90% of IP-km
Smolts	Smoltification	Temperature	**50-74% IP-km (>6 and <14 C)**	Fair	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	**Abundance leading to high risk spawner density = 0**	Poor	Newcombe and Jensen 2003	Smolt abundance to produce low risk spawner density per Spence (2008)
Watershed Processes	Hydrology	Impervious Surfaces	**0.248% of Watershed in Impervious Surfaces**	Very Good	SEC Analysis	3-6% of Watershed in Impervious Surfaces
Watershed Processes	Landscape Patterns	Agriculture	**2.75% 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	**23% of watershed >1 unit/20 acres**	Poor	EPA/RWQCB/NMFS Criteria	8-11% of watershed >1 unit/20 acres
Watershed Processes	Riparian Vegetation	Species Composition	**25-50% Historical Species Composition**	Fair	Newcombe and Jensen 2003	51-74% Intact Historical Species Composition
Watershed Processes	Sediment Transport	Road Density	**2.9 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)	**4.0 Miles/Square Mile**	Poor	Newcombe and Jensen 2003	0.1 to 0.4 Miles/Square Mile

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

Central CA Coast Coho Salmon ~ Salmon Creek

ACTIONS FOR RESTORING HABITATS

1. Restoration- Estuary

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

1.1.1. **Recovery Action:** Improve the quality and extent of freshwater lagoon habitat (see WQ parameters)

1.1.1.1. **Action Step:** Modify alterations to freshwater inflow and water quality (temperature, dissolved oxygen) and the practice of artificial breaching

1.1.1.2. **Action Step:** Evaluate the effect of nearby landuse practices and development structures which may impair or reduce the historical tidal prism and other estuarine functions and implement improvements

1.1.1.3. **Action Step:** Prevent future encroachment of landuse (agricultural, residential and commercial) into floodplain areas of the estuary

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

1.2.1. **Recovery Action:** Increase the physical extent of estuarine habitat

1.2.1.1. **Action Step:** Implement the SCC Salmon Creek Enhancement Plan by regaining as much of the historical capacity and area of the Salmon Creek Estuary as possible.

1.2.1.2. **Action Step:** Restore estuarine wetlands and sloughs, and improve prey abundance by increasing shoreline perimeter and planting native emergent and riparian species to improve foraging and cover.

1.2.1.3. **Action Step:** Assess the need to dredge Salmon Creek Estuary to increase capacity of estuarine habitat.

1.2.2. **Recovery Action:** Improve freshwater inflow

1.2.2.1. **Action Step:** Restore estuary function by increasing in-stream flow in Salmon Creek and tributaries that will provide greater freshwater input into the estuary.

1.2.2.2. **Action Step:** Improve estuarine water quality by identifying and remediating upstream pollution sources which contribute to poor water quality conditions in the estuary

1.2.3. **Recovery Action:** Improve the quality of each estuarine habitat zone

1.2.3.1. **Action Step:** Restore estuary function by reducing fine sediment input from the upper watershed.

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

1.2.3.3. **Action Step:** Monitor the habitat use of various life stages of coho salmon in the Salmon Creek estuary and associated wetlands.

1.2.4. **Recovery Action:** Increase and enhance habitat complexity features

1.2.4.1. **Action Step:** Restore estuary function in Salmon Creek Estuary by improving complex habitat features and restoring historical flooding patterns where possible.

1.2.4.2. **Action Step:** Develop Estuary Enhancement Projects to improve rearing habitat for juveniles and smolts (e.g. habitat features such as LWD, vegetative cover, deeper habitat, etc.)

1.2.4.3. **Action Step:** Monitor the effectiveness of LWD structures and other restoration projects in the estuary

1.2.5. **Recovery Action:** Increase the rate of lagoon formation and/or freshwater conversion

1.2.5.1. **Action Step:** Evaluate alterations to river mouth dynamics and implement changes to restore natural function

2. Restoration- Floodplain Connectivity

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

2.1.1. **Recovery Action:** Increase and enhance velocity refuge

2.1.1.1. **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.

2.1.1.2. **Action Step:** Avoid new development within riparian zones and the 100 year floodprone zones.

2.1.1.3. **Action Step:** Encourage willing landowners to restore historical floodplains or offchannel habitats through conservation easements, etc.

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

2.2.1. **Recovery Action:** Increase and enhance velocity refuge

2.2.1.1. **Action Step:** Identify areas where floodplain connectivity can be re-established in low gradient response reaches

2.2.1.2. **Action Step:** Identify the floodplain activation flow - the smallest flood pulse event that initiates substantial beneficial ecological processes when associated with floodplain inundation (Williams et al. 2009).

2.2.1.3. **Action Step:** Improve conditions to re-create, and restore alcove, backwater, or perennial pond habitats where channel modification has resulted in decreased shelter, LWD frequency, and habitat complexity. Develop and implement site specific plans to improve these conditions to re-create, and restore alcove, backwater, or perennial pond habitats in lower Salmon Creek.

2.2.1.4. **Action Step:** Support landowners and the Gold Ridge RCD in developing projects to improve channel conditions and restore natural channel geomorphology, including side channels and dense contiguous riparian vegetation (CDFG 2004).

3. Restoration- Habitat Complexity

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

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

3.1.1.1. **Action Step:** Promote growth of larger diameter trees where appropriate.

3.1.1.2. **Action Step:** Protect existing riparian areas to maintain LWD supply and canopy.

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

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

3.2.1. **Recovery Action:** Increase frequency of primary or staging pools.

3.2.1.1. **Action Step:** Increase pool frequency across 60% of watershed to achieve optimal conditions (>40% of pools meet primary pool criteria (>2.5 feet deep in 1st and 2nd order streams; >3 feet in third order or larger streams)) in select reaches of Nolan, Tannery, Fay, and Thurston Creeks

3.2.1.2. **Action Step:** Where feasible, design and engineer pool enhancement structures to increase the number of pools (Gold Ridge Resource Conservation District and Prunuske Chatham, Inc., 2007; CDFG 2004).

3.2.2. **Recovery Action:** Increase large wood frequency (BFW 0-10 meters)

3.2.2.1. **Action Step:** Increase LWD frequency to optimal conditions (>6 key LWD pieces/100 meters) in select reaches of Fay, Tannery, Finley, and Thurston Creeks

3.2.2.2. **Action Step:** Increase LWD frequency to optimal conditions (>2 key LWD pieces/100 meters) in Salmon Creek

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

3.2.3.1. **Action Step:** Increase shelter ratings in 75% of watershed to optimal conditions (>80 pool shelter value) in select reaches of Fay, Tannery, Finley, Thurston and Salmon Creeks

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

3.2.4.1. **Action Step:** Increase riffle frequency in 50% of watershed to achieve optimal conditions (20% riffles) by converting flatwater habitats (glides, runs, etc.) utilizing boulders and log structures in select reaches of Coleman Valley, Fay and Finley Creeks

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

3.3.1. **Recovery Action:** Improve habitat complexity

3.3.1.1. **Action Step:** Investigate the feasibility of beaver re-location and re-introductions to promote channel complexity, improve baseflows and provide rearing habitat

4. Restoration- Hydrology

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

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

4.1.1.1. **Action Step:** Develop rearing habitat curves to identify optimal base flow conditions

4.1.1.2. **Action Step:** Promote, via technical assistance and/or regulatory action, the reduction of water use affecting the natural hydrograph, development of alternative water sources, and implementation of diversion regimes protective of the natural hydrograph.

4.1.1.3. **Action Step:** Avoid and/or minimize the adverse effects of water diversion on coho salmon by establishing: a more natural hydrograph, by-pass flows, season of diversion, and off-stream storage (BM-HU-04 in CDFG 2004).

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

4.1.2.1. **Action Step:** Reduce the rate of frost protection and domestic drawdown in the spring

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

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

4.2.1.1. **Action Step:** Develop cooperative projects with private landowners to conserve summer flows

4.2.1.2. **Action Step:** Support the water conservation training conducted by the Occidental Arts and Ecology Center Water Institute, Gold Ridge RCD, and Salmon Creek Watershed Council.

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

4.2.2.1. **Action Step:** Develop floodplain enhancement and LWD projects in modified and incised channel areas of major tributaries

5. Restoration- Landscape Patterns

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

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

5.1.1.1. **Action Step:** Utilize BMP's which prevent fracturing of landscapes and interruption of natural function in forested watersheds, riparian corridors, and stream systems

5.1.1.2. **Action Step:** Avoid new development, or road construction within floodplains, riparian areas, unstable soils or other sensitive areas

5.1.1.3. **Action Step:** Conserve open space in un-fractured landscapes, protect floodplain areas and riparian corridors, and develop conservation easements

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

5.2.1. **Recovery Action:** Conserve water resources

5.2.1.1. **Action Step:** Residential landowners should utilize BMP's from Basins Of Relations: A Citizen's Guide to Protecting and Restoring Our Watersheds (OAEC, 2007), Slow it. Spread it. Sink it! (Santa Cruz Resource Conservations District, 2009) to conserve water resources

5.2.1.2. **Action Step:** Livestock and Ranch Managers should utilize Groundwork: A Handbook for Small-Scale Erosion Control in Coastal California (MRCD, 2007), and Management Tips to Enhance Land & Water Quality for Small Acreage Properties (Sotoyome Resource Conservation District 2007a), and The Grazing Handbook (Sotoyome Resource Conservation District 2007b)

5.2.1.3. **Action Step:** Agricultural users should utilize BMP's in Vineyard Frost Protection: A guide for Northern Coastal California (Sotoyome Resource Conservation District 2011)

5.2.2. **Recovery Action:** Improve sediment transport within the watershed

5.2.2.1. **Action Step:** Decommission and or re-locate riparian roads upslope to achieve desirable riparian road density criteria (<0.1 to 0.4 Miles/Square Mile)

5.2.2.2. **Action Step:** Upgrade roads (and skid trails on forestlands) to reduce surface and ditch erosion into adjacent watercourses, eliminate or upgrade ditch relief culverts, and upgrade stream crossing culverts to improve spawning gravel transport (CDFG 2004).

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

5.2.3.1. **Action Step:** Implement DS level actions

6. Restoration- Passage

No species-specific actions were developed.

7. Restoration- Pool Habitat

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

8. Restoration- Riparian

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

8.1.1. **Recovery Action:** Improve canopy cover

8.1.1.1. **Action Step:** Promote streamside conservation measures, including conservation easements, setbacks, and riparian buffers (DFG 2004).

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

8.2.1. **Recovery Action:** Increase tree diameter within 25% of watershed to achieve optimal riparian forest conditions (55 - 69% Class 5 & 6 tree)

8.2.1.1. **Action Step:** Plant native riparian species and native conifers/hardwoods in the riparian zone within the southern portion of the watershed (Salmon Creek mainstem) to increase overall tree diameter

8.2.1.2. **Action Step:** Conduct conifer release to promote growth of larger diameter trees where appropriate throughout the watershed.

8.2.1.3. **Action Step:** Promote streamside conservation measures, including conservation easements, setbacks, and riparian buffers throughout the watershed (CDFG 2004).

8.2.2. **Recovery Action:** Improve canopy cover in 25% of streams within the watershed

8.2.2.1. **Action Step:** Increase the average stream canopy to a minimum of 80% within select reaches of Salmon, Nolan and Coleman Valley Creeks.

8.2.2.2. **Action Step:** Assess riparian canopy and impacts of exotic vegetation (e.g., Arundo donax, etc.), prioritize and develop riparian habitat reclamation and enhancement programs (CDFG 2004).

8.2.2.3. **Action Step:** Encourage the cultivation and availability of locally indigenous riparian plants for use in restoration and bank stabilization (CDFG 2004)

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 and food productivity.

9.1.1.1. **Action Step:** Continue to implement erosion control projects that were assessed and inventoried in sediment assessment plans (CDFG 2004).

9.1.1.2. **Action Step:** Re-establish natural sediment delivery processes by assessing sediment delivery sources at the sub-watershed scale and prioritizing sediment reduction activities.

9.1.1.3. **Action Step:** Address sources from slides and gullies that deliver sediment and runoff to stream channels.

10. Restoration- Viability

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

10.1.1. **Recovery Action:** Increase abundance

10.1.1.1. **Action Step:** Continue the operation of the Captive Broodstock Program in Salmon Creek.

10.1.1.2. **Action Step:** Minimize departure from the genetic profile that historically existed in the population.

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

10.1.1.4. **Action Step:** Implement recovery actions where indicators rated poor or fair in high potential value areas.

10.1.1.5. **Action Step:** Monitor the effectiveness and maintenance of watershed restoration projects and augment inventories as needed (CDFG 2004).

10.1.1.6. **Action Step:** Adjust population targets and indicator ratings to reflect new habitat improvements and accessible habitat expansions

10.1.1.7. **Action Step:** Conduct habitat surveys to monitor change in key habitat variables. Specific locations to be monitored will be determined through implementation of the Coastal Salmonid Monitoring Plan

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

10.1.2.1. **Action Step:** Fund monitoring actions in Salmon Creek to evaluate success of adult reintroductions towards salmon recovery.

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

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

10.1.3.1. **Action Step:** Conduct outreach with landowners to expand broodstock releases within core areas, and remaining extirpated streams within the watershed.

10.1.3.2. **Action Step:** Use surplus broodstock to repopulate remaining extirpated streams within the watershed.

10.1.3.3. **Action Step:** Annually capture or retain (during rescue efforts) - small numbers of surplus fish from drying streams/habitats in Marin and Sonoma Counties for purposes of broodstock in Russian River, Walker and Salmon Creeks.

10.1.3.4. **Action Step:** Conduct periodic, standardized smolt outmigration surveys to estimate smolt abundance in the watershed. Surveys should occur during the same period as adult spawning surveys.

11. Restoration- Water Quality

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

11.1.1. **Recovery Action:** Improve stream temperature conditions

11.1.1.1. **Action Step:** Increase the canopy by planting native species where shade canopy is not at acceptable levels within middle Salmon Creek, Nolan, and Coleman Valley Creeks.

11.1.2. **Recovery Action:** Improve stream water quality conditions

11.1.2.1. **Action Step:** Install continuous water quality monitoring stations in lower Salmon Creek

11.1.2.2. **Action Step:** Work with livestock and ranch owners to implement BMP's to control sediment and nitrates

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

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

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

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

THREAT ABATEMENT ACTIONS

11. Restoration- Water Quality

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

11.1.1. **Recovery Action:** Improve stream temperature conditions

11.1.1.1. **Action Step:** Increase the canopy by planting native species where shade canopy is not at acceptable levels within middle Salmon Creek, Nolan, and Coleman Valley Creeks.

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

12. Threat- Agricultural Practices

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

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

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

12.1.1.2. **Action Step:** Streamline permit processing where landowners are conducting actions aligned with recovery priorities.

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

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

12.1.2.1. **Action Step:** Improve water temperature conditions for migrating smolts and summer rearing juvenile salmonids throughout 35% of watershed by increasing the canopy by planting native species where shade canopy is not at acceptable levels within middle Salmon Creek, Nolan, and Coleman Valley Creeks.

12.1.2.2. **Action Step:** Monitor instream water temperatures to determine baseline conditions and judge the efficacy of restoration actions. High priority streams include tributary and mainstem reaches within Salmon and Walker Creeks (CDFG stream survey reports).

13. Threat- Channel Modification

13.1. **Objective:** Address inadequacies of regulatory mechanisms

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

13.1.1.1. **Action Step:** All proposed flood control projects should include habitat protection, and/or alternatives that minimize impacts to salmon habitat.

13.1.1.2. **Action Step:** Channel modifying projects should be designed to ensure potential effects to salmonid habitat are fully minimized or mitigated, and where possible, existing poor conditions should be remediated.

13.1.1.3. **Action Step:** Ensure that all future and existing channel designed for flood conveyance incorporate features that enhance salmonid migration under high and low flow conditions.

13.1.1.4. **Action Step:** Modify city and county regulatory and planning processes to eliminate provisions allowing new construction of permanent infrastructure that will adversely affect watershed processes, particularly within the 100-year flood prone zones

13.1.1.5. **Action Step:** Develop a mitigation policy that requires in-kind replacement of removed large woody debris at a 3:1 ratio.

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

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

13.2.1.1. **Action Step:** Where feasible, remove obsolete bank stabilization structures from the channel which contribute to channel incision and reduced habitat complexity.

13.2.1.2. **Action Step:** Evaluate undeveloped and developed floodplain property for potential function and conservation easement and/or acquisition potential.

13.2.1.3. **Action Step:** Conduct rehabilitation activities that restore channels, floodplains and meadows to extend the duration of the summer flow and provide refuge from high winter flows, (see FLOODPLAIN for specific actions).

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

14. Threat- Disease/Predation/Competition

No species-specific actions were developed.

15. Threat- Fire/Fuel Management

No species-specific actions were developed.

16. Threat- Fishing/Collecting

No species-specific actions were developed.

17. Threat- Hatcheries

No species-specific actions were developed.

18. Threat- Livestock

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

18.1.1. **Recovery Action:** Establish conservative residual dry matter (RDM) target per acre that ensures area is not overgrazed with 1000 lbs RDM (residual dry matter)/acre left at end of grazing season. Remove cattle from pasture before soils dry out.

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

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

18.2.1.1. **Action Step:** Encourage riparian restoration to regain riparian corridors damaged from livestock and other causes.

18.2.1.2. **Action Step:** To minimize gully initiation, grazing should be kept at relatively low intensities on steeper slopes

18.2.1.3. **Action Step:** Where necessary, establish predetermined stream crossings when herding cattle between pastures.

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

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

18.2.2.1. **Action Step:** Aid landowners willing to fence off riparian areas with development of offstream alternative water sources

18.2.2.2. **Action Step:** Increase the use of water storage and catchment systems that collect rainwater in the winter for use during the dry summer and fall seasons.

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

18.2.3.1. **Action Step:** Provide funding assistance to landowners willing to fence riparian and other sensitive areas (areas prone to erosion) to exclude cattle and sheep. Calf/cow operations should take first priority for riparian fencing programs over steer operations.

18.2.3.2. **Action Step:** Encourage develop and fund riparian restoration projects to regain riparian corridors damaged from livestock and other causes.

18.2.3.3. **Action Step:** Substitute continuous season-long use of pastures in favor of rotational grazing strategies to reduce runoff. Short term, seasonal and long term rest from grazing in overgrazed areas would improve soil conditions for native revegetation and land values as well.

18.2.3.4. **Action Step:** Manage rotational grazing to aid in the reduction of noxious weeds.

19. Threat- Logging

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

19.1.1. **Recovery Action:** Prevent future impacts to habitat complexity

19.1.1.1. **Action Step:** Acquire key large tracts of forestlands identified as a priority by Federal, State, local government, and non-governmental organizations

19.1.1.2. **Action Step:** Encourage forest management which allows for optimal levels of natural LWD recruitment of larger older trees into stream channels

19.1.1.3. **Action Step:** Conserve and manage forestlands for older forest stages.

19.1.1.4. **Action Step:** Assign NMFS staff to conduct THP reviews of the highest priority areas using revised "Guidelines for NMFS Staff when Reviewing Timber Operations: Avoiding Take and Harm of Salmon and Steelhead" (NMFS 2004).

19.1.1.5. **Action Step:** Establish greater oversight and post-harvest monitoring by the permitting agency for operations within high value habitat areas

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

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

19.2.1.1. **Action Step:** Develop a Transportation Plan and adequately upgrade necessary roads, and relocate and/or decommission riparian or unnecessary roads (see ROADS for specific actions/areas)

19.2.1.2. **Action Step:** Develop a Road Sediment Reduction Plan that prioritizes problem sites and outlines implementation and a timeline of necessary actions.

19.2.1.3. **Action Step:** Utilize BMP's to properly construct roads for stormproofing and Avoid the construction of roads in the riparian zone

20. Threat- Mining

No species-specific actions were developed.

21. Threat- Recreation

No species-specific actions were developed.

22. Threat- Residential/Commercial Development

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

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

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

22.1.1.2. **Action Step:** Disperse discharge from commercial and residential areas into a spatially distributed network rather than a few point discharges.

22.1.1.3. **Action Step:** Improve water quality where necessary by addressing residential and commercial pollutant sources.

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

22.1.2.1. **Action Step:** Develop riparian setbacks/buffers where they do not currently occur, and enforce requirements of local regulations where they do

22.1.2.2. **Action Step:** Enforce requirements of local regulations and riparian/setbacks

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

22.1.2.4. **Action Step:** Assess efficacy and necessity of ongoing stream maintenance practices and evaluate, avoid, minimize and/or mitigate their impacts to rearing and migrating coho salmon.

22.1.2.5. **Action Step:** Address failing septic systems in rural areas

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

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

22.2.1.1. **Action Step:** Utilize native plants when landscaping and discourage the use of exotic invasives

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

22.2.1.3. **Action Step:** Explore the use of conservation easements to provide incentives for private landowners to preserve riparian corridors

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

22.2.2.1. **Action Step:** Encourage the use and provide incentives for rooftop water storage and other conservation devices

23. Threat- Roads/Railroads

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

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

23.1.1.1. **Action Step:** Establish a moratorium on 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.

23.1.1.2. **Action Step:** Implement DS level recommendations

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

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

23.2.1.1. **Action Step:** Assess and redesign transportation network to minimize road density and maximize transportation efficiency.

23.2.1.2. **Action Step:** Assess roads in Nolan and Thurston Creeks to identify high priority and high sediment yield sources.

23.2.1.3. **Action Step:** Implement results of existing sediment source surveys, and assess remaining watershed road networks to eliminate high priority and high sediment yield sources.

23.2.1.4. **Action Step:** Establish adequate spoils storage sites throughout the watershed so material from landslides and road maintenance can be stored safely away from watercourses. Coordinate these efforts with all landowners in the watershed.

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

23.2.1.6. **Action Step:** Utilize best management practices for road construction (e.g. Fishnet 4C, 2004; Weaver and Hagans, 1994; Sommarstrom et al., 2002; Oregon Department of Transportation, 1999).

24. Threat- Severe Weather Patterns

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

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

24.1.1.1. **Action Step:** Work with CDFG, County of Sonoma, State Parks, municipalities, and knowledgeable biologists to develop emergency rules and adopt implementation agreements.

24.1.1.2. **Action Step:** Land use zoning should be appropriate to the site and be tolerant to anticipated conditions (e.g., tolerant to frequent flooding).

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

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

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

24.2.1.1. **Action Step:** Minimize water use and seek alternatives during droughts.

24.2.1.2. **Action Step:** Work with land owners or public agencies to acquire water that would be utilized to minimize effects of droughts.

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

24.2.2.1. **Action Step:** Maintain canopy levels at desirable levels in all streams and restore canopy levels to desirable levels in high value habitat areas (See WATER QUALITY for specific actions/areas

25. Threat- Water Diversion/Impoundment

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

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

25.1.1.1. **Action Step:** Promote off-channel storage to reduce impacts of water diversion (e.g., storage tanks for rural residential users).

25.1.1.2. **Action Step:** Promote the use of reclaimed water for agricultural or other uses.

25.1.1.3. **Action Step:** Promote water conservation by the public, water agencies, agriculture, private industry, and the citizenry.

25.1.2. **Recovery Action:** Prevent impairment to estuary

25.1.2.1. **Action Step:** Identify upstream pollution sources which contribute to poor water quality conditions in the estuary

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

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

26. Threat- Watershed Process

No species-specific actions were developed.

Table 3: Implementation Table ~ Salmon 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	
SC-CCC-1.1	**Objective**	**Estuary**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-1.1.1	Recovery Action	Estuary	Improve the quality and extent of freshwater lagoon habitat (see WQ parameters)										
SC-CCC-1.1.1.1	Action Step	Estuary	Modify alterations to freshwater inflow and water quality (temperature, dissolved oxygen) and the practice of artificial breaching	2	12	CDFG, NMFS, Sonoma County Water Agency, USACE	250.00	250.00	100.00			600	
SC-CCC-1.1.1.2	Action Step	Estuary	Evaluate the effect of nearby landuse practices and development structures which may impair or reduce the historical tidal prism and other estuarine functions and implement improvements	3	10	CA Coastal Commission, California Coastal Conservancy, CDFG						TBD	Costs associated with removal of structures will depend on the number and type of structures identified and cannot be accurately determined at this time.
SC-CCC-1.1.1.3	Action Step	Estuary	Prevent future encroachment of landuse (agricultural, residential and commercial) into floodplain areas of the estuary	3	5	CDFG, RWQCB, Sonoma County, USACE							
SC-CCC-1.2	**Objective**	**Estuary**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range.**										
SC-CCC-1.2.1	Recovery Action	Estuary	Increase the physical extent of estuarine habitat										
SC-CCC-1.2.1.1	Action Step	Estuary	Implement the SCC Salmon Creek Enhancement Plan by regaining as much of the historical capacity and area of the Salmon Creek Estuary as possible.	2	30	California Coastal Conservancy, CDFG, FishNet 4C, NMFS HCD, Private Landowners, RWQCB, Sonoma County, State Parks, USFWS						TBD	Costs and duration are dependent on the specific mechanisms chosen to accomplish the task.
SC-CCC-1.2.1.2	Action Step	Estuary	Restore estuarine wetlands and sloughs, and improve prey abundance by increasing shoreline perimeter and planting native emergent and riparian species to improve foraging and cover.	2	10	CA Coastal Commission, California Coastal Conservancy, CDFG, Private Landowners	415.00	415.00				830	Cost based on treating 5% of 61 acres of estuarine habitat at a rate of $272,120/acre for riparian planting and ELJ.

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	
SC-CCC-1.2.1.3	Action Step	Estuary	Assess the need to dredge Salmon Creek Estuary to increase capacity of estuarine habitat.	2	10	California Coastal Conservancy, CDFG, NMFS HCD, USACE						TBD	Cost is difficult to ascertain at this time.
SC-CCC-1.2.2	Recovery Action	Estuary	Improve freshwater inflow										
SC-CCC-1.2.2.1	Action Step	Estuary	Restore estuary function by increasing in-stream flow in Salmon Creek and tributaries that will provide greater freshwater input into the estuary.	2	30	CDFG, Gold Ridge RCD, NMFS, Private Landowners						TBD	Increasing flow within Salmon Creek will likely entail purchasing water rights upstream. The cost of purchasing water rights is unknown at this time.
SC-CCC-1.2.2.2	Action Step	Estuary	Improve estuarine water quality by identifying and remediating upstream pollution sources which contribute to poor water quality conditions in the estuary	2		California Coastal Conservancy, RWQCB, Sonoma County, Sonoma County Water Agency, SWRCB						TBD	
SC-CCC-1.2.3	Recovery Action	Estuary	Improve the quality of each estuarine habitat zone										
SC-CCC-1.2.3.1	Action Step	Estuary	Restore estuary function by reducing fine sediment input from the upper watershed.	2	30	CDFG, Gold Ridge RCD, NMFS, Private Landowners, Sonoma County Water Agency						TBD	
SC-CCC-1.2.3.2	Action Step	Estuary	Restore estuarine habitat and the associated wetlands and sloughs by providing fully functioning habitat (CDFG 2004).	2	60	Gold Ridge RCD, Sonoma County						TBD	Costs related to increase physical extent of estuary habitat.
SC-CCC-1.2.3.3	Action Step	Estuary	Monitor the habitat use of various life stages of coho salmon in the Salmon Creek estuary and associated wetlands.	2	30	CDFG, Gold Ridge RCD, NMFS						TBD	
SC-CCC-1.2.4	Recovery Action	Estuary	Increase and enhance habitat complexity features										
SC-CCC-1.2.4.1	Action Step	Estuary	Restore estuary function in Salmon Creek Estuary by improving complex habitat features and restoring historical flooding patterns where possible.	2	30	California Coastal Conservancy, CDFG, NMFS HCD, NOAA RC, Sonoma County, USACE, USFWS							Cost related to increasing physical extent of estuary habitat.

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	
SC-CCC-1.2.4.2	Action Step	Estuary	Develop Estuary Enhancement Projects to improve rearing habitat for juveniles and smolts (e.g. habitat features such as LWD, vegetative cover, deeper habitat, etc.)	2	15	California Coastal Conservancy, CDFG, County Planning, NOAA RC, Private Consultants, Private Landowners, RCD, Sonoma County Water Agency							Cost related to increasing physical extent of estuary habitat.
SC-CCC-1.2.4.3	Action Step	Estuary	Monitor the effectiveness of LWD structures and other restoration projects in the estuary	2	30	CDFG, Gold Ridge RCD						TBD	
SC-CCC-1.2.5	Recovery Action	Estuary	Increase the rate of lagoon formation and/or freshwater conversion										
SC-CCC-1.2.5.1	Action Step	Estuary	Evaluate alterations to river mouth dynamics and implement changes to restore natural function	2	10	California Coastal Conservancy, CDFG, NMFS, Sonoma County, Sonoma County Water Agency, State Parks, USACE						TBD	Cost likely related to above action steps.
SC-CCC-2.1	**Objective**	**Floodplain Connectivity**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-2.1.1	Recovery Action	Floodplain Connectivity	Increase and enhance velocity refuge										
SC-CCC-2.1.1.1	Action Step	Floodplain Connectivity	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	5	CDFG, Gold Ridge RCD, NOAA RC						tbd	
SC-CCC-2.1.1.2	Action Step	Floodplain Connectivity	Avoid new development within riparian zones and the 100 year floodprone zones.	2	30	CDFG, NMFS, Sonoma County						TBD	
SC-CCC-2.1.1.3	Action Step	Floodplain Connectivity	Encourage willing landowners to restore historical floodplains or offchannel habitats through conservation easements, etc.	3	10	County Planning, Land Trusts, Private Landowners, RCD						TBD	
SC-CCC-2.2	**Objective**	**Floodplain Connectivity**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										

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	
SC-CCC-2.2.1	Recovery Action	Floodplain Connectivity	Increase and enhance velocity refuge										
SC-CCC-2.2.1.1	Action Step	Floodplain Connectivity	Identify areas where floodplain connectivity can be re-established in low gradient response reaches	2	10	Farm Bureau, NMFS HCD, Public Works, RCD	103.50	103.50				207	Cost for wetland monitoring estimated at $206,493/project.
SC-CCC-2.2.1.2	Action Step	Floodplain Connectivity	Identify the floodplain activation flow - the smallest flood pulse event that initiates substantial beneficial ecological processes when associated with floodplain inundation (Williams et al. 2009).	2	10	Private Consultants, Private Landowners, Sonoma County	31.50	31.50				63	Cost for stream flow model estimated at $63,005/project.
SC-CCC-2.2.1.3	Action Step	Floodplain Connectivity	Improve conditions to re-create, and restore alcove, backwater, or perennial pond habitats where channel modification has resulted in decreased shelter, LWD frequency, and habitat complexity. Develop and implement site specific plans to improve these conditions to re-create, and restore alcove, backwater, or perennial pond habitats in lower Salmon Creek.	2	10	California Coastal Conservancy, MMWD, NMFS HCD, RCD	90.00	90.00				180	Cost based on treating 5 miles (assume 1 project/mile in 25% High IP) at a rate of $36,046/mile.
SC-CCC-2.2.1.4	Action Step	Floodplain Connectivity	Support landowners and the Gold Ridge RCD in developing projects to improve channel conditions and restore natural channel geomorphology, including side channels and dense contiguous riparian vegetation (CDFG 2004).	3	60	Gold Ridge RCD, Private Landowners						tbd	
SC-CCC-3.1	**Objective**	**Habitat Complexity**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-3.1.1	Recovery Action	Habitat Complexity	Improve shelter rating										
SC-CCC-3.1.1.1	Action Step	Habitat Complexity	Promote growth of larger diameter trees where appropriate.	3	20	CDFG, MMWD, NMFS						In-Kind	Cost of initial dialog is expected to be minimal.
SC-CCC-3.1.1.2	Action Step	Habitat Complexity	Protect existing riparian areas to maintain LWD supply and canopy.	2	20	CDFG, Gold Ridge RCD						In-Kind	
SC-CCC-3.1.1.3	Action Step	Habitat Complexity	Maintain current LWD, boulders, and other structure-providing features to maintain current stream complexity, pool frequency, and depth (CDFG 2004).	2	60	Gold Ridge RCD, Private Consultants, Private Landowners, Sonoma County						In-Kind	

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	
SC-CCC-3.2	**Objective**	**Habitat Complexity**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range.**										
SC-CCC-3.2.1	Recovery Action	Habitat Complexity	Increase frequency of primary or staging pools.										
SC-CCC-3.2.1.1	Action Step	Habitat Complexity	Increase pool frequency across 60% of watershed to achieve optimal conditions (>40% of pools meet primary pool criteria (>2.5 feet deep in 1st and 2nd order streams; >3 feet in third order or larger streams)) in select reaches of Nolan, Tannery, Fay, and Thurston Creeks	2	10	CDFG, NOAA RC, Private Consultants, Private Landowners, Trout Unlimited	112.50	112.50				225	Cost based on treating 9 miles of stream at a rate of $25,000/mile for placement of LWD. If ELJ used for increasing pool frequency, cost would be $2,730,000 averaging 3 ELJ/mile.
SC-CCC-3.2.1.2	Action Step	Habitat Complexity	Where feasible, design and engineer pool enhancement structures to increase the number of pools (Gold Ridge Resource Conservation District and Prunuske Chatham, Inc., 2007; CDFG 2004).	2	60	CDFG, Gold Ridge RCD, NOAA RC						TBD	Cost accounted for to increase pool frequency across 60% in watershed.
SC-CCC-3.2.2	Recovery Action	Habitat Complexity	Increase large wood frequency (BFW 0-10 meters)										
SC-CCC-3.2.2.1	Action Step	Habitat Complexity	Increase LWD frequency to optimal conditions (>6 key LWD pieces/100 meters) in select reaches of Fay, Tannery, Finley, and Thurston Creeks	2	10	CDFG, NOAA RC, Private Consultants, Private Landowners, Trout Unlimited							Cost related to increase frequency of primary or staging pool habitat.
SC-CCC-3.2.2.2	Action Step	Habitat Complexity	Increase LWD frequency to optimal conditions (>2 key LWD pieces/100 meters) in Salmon Creek	2	5	CDFG, NOAA RC, Private Consultants, Private Landowners	275.00					275	Cost based on treating 11 miles at a rate of $25,000/mile.
SC-CCC-3.2.3	Recovery Action	Habitat Complexity	Improve shelter rating										
SC-CCC-3.2.3.1	Action Step	Habitat Complexity	Increase shelter ratings in 75% of watershed to optimal conditions (>80 pool shelter value) in select reaches of Fay, Tannery, Finley, Thurston and Salmon Creeks	2	10	CDFG, NOAA RC, Private Consultants, Private Landowners, Trout Unlimited							Cost related to increase pool frequency and LWD placement activities.
SC-CCC-3.2.4	Recovery Action	Habitat Complexity	Improve pool:riffle:flatwater ratio										

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	
SC-CCC-3.2.4.1	Action Step	Habitat Complexity	Increase riffle frequency in 50% of watershed to achieve optimal conditions (20% riffles) by converting flatwater habitats (glides, runs, etc.) utilizing boulders and log structures in select reaches of Coleman Valley, Fay and Finley Creeks	2	5	CDFG, NOAA RC, Private Consultants, Private Landowners	150.00					150	Cost based on treating 6 miles of stream at a rate of $25,000/mile
SC-CCC-3.3	**Objective**	**Habitat Complexity**	**Address other natural or manmade factors affecting the species' continued existence**										
SC-CCC-3.3.1	Recovery Action	Habitat Complexity	Improve habitat complexity										
SC-CCC-3.3.1.1	Action Step	Habitat Complexity	Investigate the feasibility of beaver re-location and re-introductions to promote channel complexity, improve baseflows and provide rearing habitat	2	10		5.00	5.00				10	Cost for beaver re-introduction estimated at $10,000/beaver family translocation.
SC-CCC-4.1	**Objective**	**Hydrology**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-4.1.1	Recovery Action	Hydrology	Improve flow conditions (baseflow conditions)										
SC-CCC-4.1.1.1	Action Step	Hydrology	Develop rearing habitat curves to identify optimal base flow conditions	2	20	CDFG, SWRCB						TBD	Cost accounted for in stream flow model.
SC-CCC-4.1.1.2	Action Step	Hydrology	Promote, via technical assistance and/or regulatory action, the reduction of water use affecting the natural hydrograph, development of alternative water sources, and implementation of diversion regimes protective of the natural hydrograph.	2	60	Gold Ridge RCD, Private Landowners						In-Kind	
SC-CCC-4.1.1.3	Action Step	Hydrology	Avoid and/or minimize the adverse effects of water diversion on coho salmon by establishing: a more natural hydrograph, by-pass flows, season of diversion, and off-stream storage (BM-HU-04 in CDFG 2004).	1	20	Gold Ridge RCD, Private Consultants, Private Landowners, Sonoma County							Stream flow model should identify flow levels necessary to maintain suitable habitat conditions for coho salmon.
SC-CCC-4.1.2	Recovery Action	Hydrology	Improve flow conditions (instantaneous conditions)										
SC-CCC-4.1.2.1	Action Step	Hydrology	Reduce the rate of frost protection and domestic drawdown in the spring	2	5	CDFG, CDFG Law Enforcement, NMFS HCD, NMFS OLE, Private Consultants, Private Landowners, RCD, SWRCB, UC Extension						TBD	Cost difficult to determine based on willingness of landowners.

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	
SC-CCC-4.2	**Objective**	**Hydrology**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-4.2.1	Recovery Action	Hydrology	Improve flow conditions (baseflow conditions)										
SC-CCC-4.2.1.1	Action Step	Hydrology	Develop cooperative projects with private landowners to conserve summer flows	1	5	CDFG, NFWF, NMFS HCD, Private Consultants, Private Landowners, RCD						TBD	
SC-CCC-4.2.1.2	Action Step	Hydrology	Support the water conservation training conducted by the Occidental Arts and Ecology Center Water Institute, Gold Ridge RCD, and Salmon Creek Watershed Council.	2	20	Gold Ridge RCD, Private Consultants, Private Landowners, Sonoma County						In-Kind	
SC-CCC-4.2.2	Recovery Action	Hydrology	Minimize redd scour										
SC-CCC-4.2.2.1	Action Step	Hydrology	Develop floodplain enhancement and LWD projects in modified and incised channel areas of major tributaries	2	10	California Conservations Corps, CDFG, NOAA RC, Private Consultants, Private Landowners, Trout Unlimited						TBD	Cost accounted for in other action steps.
SC-CCC-5.1	**Objective**	**Landscape Patterns**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-5.1.1	Recovery Action	Landscape Patterns	Prevent increased landscape disturbance										
SC-CCC-5.1.1.1	Action Step	Landscape Patterns	Utilize BMP's which prevent fracturing of landscapes and interruption of natural function in forested watersheds, riparian corridors, and stream systems	3	100							In-Kind	
SC-CCC-5.1.1.2	Action Step	Landscape Patterns	Avoid new development, or road construction within floodplains, riparian areas, unstable soils or other sensitive areas	3	100							In-Kind	
SC-CCC-5.1.1.3	Action Step	Landscape Patterns	Conserve open space in un-fractured landscapes, protect floodplain areas and riparian corridors, and develop conservation easements	3	100							In-Kind	This recommendation should be considered standard practice.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs ($K)						Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25	Entire Duration	
SC-CCC-5.2	**Objective**	**Landscape Patterns**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-5.2.1	Recovery Action	Landscape Patterns	Conserve water resources										
SC-CCC-5.2.1.1	Action Step	Landscape Patterns	Residential landowners should utilize BMP's from Basins Of Relations: A Citizen's Guide to Protecting and Restoring Our Watersheds (OAEC, 2007), Slow it. Spread it. Sink it! (Santa Cruz Resource Conservations District, 2009) to conserve water resources	3	60	CDFG, City Planning, County Planning, MMWD, Private Consultants, Private Landowners, Public Works, SWRCB						In-Kind	
SC-CCC-5.2.1.2	Action Step	Landscape Patterns	Livestock and Ranch Managers should utilize Groundwork: A Handbook for Small-Scale Erosion Control in Coastal California (MRCD, 2007), and Management Tips to Enhance Land & Water Quality for Small Acreage Properties (Sotoyome Resource Conservation District 2007a), and The Grazing Handbook (Sotoyome Resource Conservation District 2007b)	3	60	Farm Bureau, Private Consultants, Private Landowners, RCD						In-Kind	
SC-CCC-5.2.1.3	Action Step	Landscape Patterns	Agricultural users should utilize BMP's in Vineyard Frost Protection: A guide for Northern Coastal California (Sotoyome Resource Conservation District 2011)	3	60	CDFG, Farm Bureau, NRCS, Private Consultants, Private Landowners, SWRCB						In-Kind	
SC-CCC-5.2.2	Recovery Action	Landscape Patterns	Improve sediment transport within the watershed										
SC-CCC-5.2.2.1	Action Step	Landscape Patterns	Decommission and or re-locate riparian roads upslope to achieve desirable riparian road density criteria (<0.1 to 0.4 Miles/Square Mile)	2	10	Private Landowners, RCD	120.00	120.00				240	Cost based on decommissioning 20 miles of riparian road at a rate of $12,000/mile
SC-CCC-5.2.2.2	Action Step	Landscape Patterns	Upgrade roads (and skid trails on forestlands) to reduce surface and ditch erosion into adjacent watercourses, eliminate or upgrade ditch relief culverts, and upgrade stream crossing culverts to improve spawning gravel transport (CDFG 2004).	2	10	Private Landowners, Public Works, RCD	210.00	210.00				420	Cost based on upgrading 20 miles of road network at a rate of $21,000/mile.
SC-CCC-5.2.3	Recovery Action	Landscape Patterns	Prevent increased landscape disturbance										
SC-CCC-5.2.3.1	Action Step	Landscape Patterns	Implement DS level actions	3									

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	
SC-CCC-8.1	**Objective**	**Riparian**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-8.1.1	Recovery Action	Riparian	Improve canopy cover										
SC-CCC-8.1.1.1	Action Step	Riparian	Promote streamside conservation measures, including conservation easements, setbacks, and riparian buffers (DFG 2004).	2	20	CDFG, Gold Ridge RCD, NMFS, NRCS, Private Consultants, Private Landowners, USFWS						TBD	Cost difficult to determine because of landowner participation and feasibility to implement conservation measures.
SC-CCC-8.2	**Objective**	**Riparian**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-8.2.1	Recovery Action	Riparian	Increase tree diameter within 25% of watershed to achieve optimal riparian forest conditions (55 - 69% Class 5 & 6 tree)										
SC-CCC-8.2.1.1	Action Step	Riparian	Plant native riparian species and native conifers/hardwoods in the riparian zone within the southern portion of the watershed (Salmon Creek mainstem) to increase overall tree diameter	2	20	CDFG, NOAA RC, Private Consultants, Private Landowners, RCD	402.50	402.50	402.50	402.50		1,610	Cost based on treating 1 mile (assume 80 acres/mile in 5% High IP) at a rate of $20,057/acre..
SC-CCC-8.2.1.2	Action Step	Riparian	Conduct conifer release to promote growth of larger diameter trees where appropriate throughout the watershed.	2	20	Board of Forestry, Private Consultants, Private Landowners	85.50	85.50	85.50	85.50		342	Cost based on treating 3 miles (assume 80 acres/mile in 15% High IP) at a rate of $1,422/acre.
SC-CCC-8.2.1.3	Action Step	Riparian	Promote streamside conservation measures, including conservation easements, setbacks, and riparian buffers throughout the watershed (CDFG 2004).	2	50	City Planning, Land Trusts, Sonoma County						In-Kind	
SC-CCC-8.2.2	Recovery Action	Riparian	Improve canopy cover in 25% of streams within the watershed										
SC-CCC-8.2.2.1	Action Step	Riparian	Increase the average stream canopy to a minimum of 80% within select reaches of Salmon, Nolan and Coleman Valley Creeks.	2	5	CDFG, NOAA RC, Private Landowners, RCD						TBD	Cost related to increase tree diameter in 25% of watershed in southern portion of Salmon Creek.
SC-CCC-8.2.2.2	Action Step	Riparian	Assess riparian canopy and impacts of exotic vegetation (e.g., Arundo donax, etc.), prioritize and develop riparian habitat reclamation and enhancement programs (CDFG 2004).	3	5	Gold Ridge RCD, Private Consultants, Private Landowners	72.00					72	Cost for riparian monitoring estimated at $71,436/project. Cost for enhancing riparian habitat 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	
SC-CCC-8.2.2.3	Action Step	Riparian	Encourage the cultivation and availability of locally indigenous riparian plants for use in restoration and bank stabilization (CDFG 2004)	2	60	CDFG, Gold Ridge RCD, NRCS, Private Consultants, Private Landowners						In-Kind	
SC-CCC-9.1	**Objective**	**Sediment**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range.**										
SC-CCC-9.1.1	Recovery Action	Sediment	Improve instream gravel quality and food productivity.										
SC-CCC-9.1.1.1	Action Step	Sediment	Continue to implement erosion control projects that were assessed and inventoried in sediment assessment plans (CDFG 2004).	2	60	Gold Ridge RCD, Private Consultants, Private Landowners, Sonoma County						TBD	
SC-CCC-9.1.1.2	Action Step	Sediment	Re-establish natural sediment delivery processes by assessing sediment delivery sources at the sub-watershed scale and prioritizing sediment reduction activities.	2	60	Gold Ridge RCD, NRCS, Private Consultants, Private Landowners, Sonoma County						TBD	
SC-CCC-9.1.1.3	Action Step	Sediment	Address sources from slides and gullies that deliver sediment and runoff to stream channels.	2	10	Gold Ridge RCD, NRCS, Private Consultants, Private Landowners, Sonoma County	34.00	34.00				68	Cost for erosion assessment (assume 25% of total watershed acres) estimated at $12/acre.
SC-CCC-10.1	**Objective**	**Viability**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-10.1.1	Recovery Action	Viability	Increase abundance										
SC-CCC-10.1.1.1	Action Step	Viability	Continue the operation of the Captive Broodstock Program in Salmon Creek.	1								TBD	Estimating cost for continued operation of the Captive Broodstock Program is difficult to determine at this time. Cost estimate for hatchery production estimated at $387/fish. To make an estimate of cost for this action step, current and future production levels need to be identified.

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	
SC-CCC-10.1.1.2	Action Step	Viability	Minimize departure from the genetic profile that historically existed in the population.	1	5	NOAA SWFSC						TBD	
SC-CCC-10.1.1.3	Action Step	Viability	Continue to rescue juvenile coho salmon with existing permittees that are under an imminent risk of stranding and mortality and relocate to suitable habitat when deemed appropriate by NMFS and CDFG	2	10	CDFG, Gold Ridge RCD, NMFS, Trout Unlimited						In-Kind	Existing operations
SC-CCC-10.1.1.4	Action Step	Viability	Implement recovery actions where indicators rated poor or fair in high potential value areas.										
SC-CCC-10.1.1.5	Action Step	Viability	Monitor the effectiveness and maintenance of watershed restoration projects and augment inventories as needed (CDFG 2004).	2	20	CDFG, Gold Ridge RCD, NMFS	28.00	28.00	28.00	28.00		112	Cost for fish/habitat effectiveness monitoring estimated at $111,192/project.
SC-CCC-10.1.1.6	Action Step	Viability	Adjust population targets and indicator ratings to reflect new habitat improvements and accessible habitat expansions	3	10	NMFS						TBD	
SC-CCC-10.1.1.7	Action Step	Viability	Conduct habitat surveys to monitor change in key habitat variables. Specific locations to be monitored will be determined through implementation of the Coastal Salmonid Monitoring Plan	2		CDFG, NMFS						22,000	Cost for habitat surveys estimated at $333/IP km.
SC-CCC-10.1.2	Recovery Action	Viability	Increase spawner density										
SC-CCC-10.1.2.1	Action Step	Viability	Fund monitoring actions in Salmon Creek to evaluate success of adult reintroductions towards salmon recovery.	2	20	CDFG	32.00	32.00	32.00	32.00		128	Cost for annual adult spawner ground surveys estimated at $64,040/year for Central Coast diversity stratum.
SC-CCC-10.1.2.2	Action Step	Viability	Conduct periodic, standardized spawning surveys to estimate adult abundance in the watershed. Surveys should include all three cohorts.	2	20	CDFG, Gold Ridge RCD, NMFS							
SC-CCC-10.1.3	Recovery Action	Viability	Increase spatial structure and diversity										
SC-CCC-10.1.3.1	Action Step	Viability	Conduct outreach with landowners to expand broodstock releases within core areas, and remaining extirpated streams within the watershed.	2	2	Gold Ridge RCD						In-Kind	
SC-CCC-10.1.3.2	Action Step	Viability	Use surplus broodstock to repopulate remaining extirpated streams within the watershed.	1	10	CDFG, NMFS						TBD	
SC-CCC-10.1.3.3	Action Step	Viability	Annually capture or retain (during rescue efforts) - small numbers of surplus fish from drying streams/habitats in Marin and Sonoma Counties for purposes of broodstock in Russian River, Walker and Salmon Creeks.	1	10	CDFG						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	
SC-CCC-10.1.3.4	Action Step	Viability	Conduct periodic, standardized smolt outmigration surveys to estimate smolt abundance in the watershed. Surveys should occur during the same period as adult spawning surveys.	2	20	CDFG, Gold Ridge RCD, NMFS	50.00	50.00	50.00	50.00		200	Cost for smolt outmigrant trapping estimated at $50,030/year.
SC-CCC-11.1	**Objective**	**Water Quality**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-11.1.1	Recovery Action	Water Quality	Improve stream temperature conditions										
SC-CCC-11.1.1.1	Action Step	Water Quality	Increase the canopy by planting native species where shade canopy is not at acceptable levels within middle Salmon Creek, Nolan, and Coleman Valley Creeks.	2									Cost accounted for in other action steps.
SC-CCC-11.1.2	Recovery Action	Water Quality	Improve stream water quality conditions										
SC-CCC-11.1.2.1	Action Step	Water Quality	Install continuous water quality monitoring stations in lower Salmon Creek	3	5	NMFS, Private Landowners, RWQCB	15.00					15	Cost for continuous water quality monitoring stations estimated at $5,000/station. Assume minimum of 3. Cost does not account for maintenance or data management.
SC-CCC-11.1.2.2	Action Step	Water Quality	Work with livestock and ranch owners to implement BMP's to control sediment and nitrates	3	30	NRCS, Private Landowners, RCD						In-Kind	
SC-CCC-11.1.3	Recovery Action	Water Quality	Reduce turbidity and suspended sediment										Water quality is impaired from land use practices in the watershed. Many landuse practices degrade water quality and coho salmon survival, principally through the input of fine sediment which results in increased turbidity, which smothers spawning gravels, reduces food production, and fills in rearing habitats. Sources of sediment input include roads and road maintenance, agriculture, residential development, and logging.
SC-CCC-11.1.3.1	Action Step	Water Quality	Disperse discharge from new or upgraded commercial and residential areas into a spatially distributed network rather than a few point discharges, which can result in locally severe erosion and disruption of riparian vegetation and instream habitat.	2	100							TBD	Cost to upgrade stormwater discharge points cannot be determined at this time, but it may be significant. Turbidity data (NHI, 2010) indicated elevated levels during the winter and spring following seasonal rainfall events. Elevated turbidity levels could injure gills, reduce feeding efficiency and adversely affect growth. Increased rates of turbidity and temperature are likely the result of land and water management practices in the watershed. Winter rearing juveniles are the primary life-stage affected by high turbidity levels.

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	
SC-CCC-11.1.3.2	Action Step	Water Quality	Implement education programs and modify policies and procedures to improve riparian corridor protection, maintain channel integrity, implement alternatives to hard bank protection, and retain large woody debris.	3	10							In-Kind	
SC-CCC-11.1.3.3	Action Step	Water Quality	Implement Best Management Practices such as those in the Fish Friendly Farming program (California Land Stewardship Institute), or other cooperative conservation programs.	3	3							In-Kind	
SC-CCC-12.1	**Objective**	**Agricultural Practices**	**Address the present or threatened destruction, modification or curtailment of the species habitat or range.**										
SC-CCC-12.1.1	Recovery Action	Agricultural Practices	Prevent increased landscape disturbance										
SC-CCC-12.1.1.1	Action Step	Agricultural Practices	Implement Best Management Practices such as those in the Fish Friendly Farming program (California Land Stewardship Institute), or other cooperative conservation programs.	2	10	CDFG, Farm Bureau, NMFS, Private Landowners, RCD						TBD	Cost is TBD since the vagaries of the plan are unknown at this time.
SC-CCC-12.1.1.2	Action Step	Agricultural Practices	Streamline permit processing where landowners are conducting actions aligned with recovery priorities.	3	5	CDFG, NMFS, NRCS, RCD, SWRCB, USACE						In-Kind	Streamlining permit processing is not expected to cost much, and may save money through future efficiencies.
SC-CCC-12.1.1.3	Action Step	Agricultural Practices	Solicit cooperation from NRCS, RCDs, Farm Bureau, and others to devise incentive programs and incentive-based approaches to encourage increased involvement and support existing landowners who conduct operations in a manner compatible with salmon recovery priorities.	3	10	CDFG, Farm Bureau, NMFS, NRCS, Private Landowners, RCD						In-Kind	Soliciting cooperation not expected to cost much outside of already existing federal and state and local salaries.
SC-CCC-12.1.2	Recovery Action	Agricultural Practices	Prevent adverse alterations to riparian species composition and structure										
SC-CCC-12.1.2.1	Action Step	Agricultural Practices	Improve water temperature conditions for migrating smolts and summer rearing juvenile salmonids throughout 35% of watershed by increasing the canopy by planting native species where shade canopy is not at acceptable levels within middle Salmon Creek, Nolan, and Coleman Valley Creeks.	2	20	CDFG, NMFS, NOAA RC, NRCS, Private Landowners, RCD	2,025	2,025	2,025	2,025		8,100	Cost based on treating 5 miles of stream (assume 80 acres/mile in 5% High IP) at a rate of $20,057/acre.

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	
SC-CCC-12.1.2.2	Action Step	Agricultural Practices	Monitor instream water temperatures to determine baseline conditions and judge the efficacy of restoration actions. High priority streams include tributary and mainstem reaches within Salmon and Walker Creeks (CDFG stream survey reports).	2	5	CDFG, NMFS, NRCS, Private Landowners, RCD	5.00					5	Cost for stream temperature gauges estimated at $500/gauge. Assume a minimum of 10. Cost does not account for maintenance or data management.
SC-CCC-13.1	**Objective**	**Channel Modification**	**Address inadequacies of regulatory mechanisms**										
SC-CCC-13.1.1	Recovery Action	Channel Modification	Prevent impairment to floodplain connectivity										
SC-CCC-13.1.1.1	Action Step	Channel Modification	All proposed flood control projects should include habitat protection, and/or alternatives that minimize impacts to salmon habitat.	2	30	NMFS PRD, Sonoma County, USACE						In-Kind	
SC-CCC-13.1.1.2	Action Step	Channel Modification	Channel modifying projects should be designed to ensure potential effects to salmonid habitat are fully minimized or mitigated, and where possible, existing poor conditions should be remediated.	2	50	NMFS PRD, USACE						In-Kind	
SC-CCC-13.1.1.3	Action Step	Channel Modification	Ensure that all future and existing channel designed for flood conveyance incorporate features that enhance salmonid migration under high and low flow conditions.	3	60	NMFS PRD, USACE						In-Kind	
SC-CCC-13.1.1.4	Action Step	Channel Modification	Modify city and county regulatory and planning processes to eliminate provisions allowing new construction of permanent infrastructure that will adversely affect watershed processes, particularly within the 100-year flood prone zones	3	50	City Planning, Sonoma County, USACE						In-Kind	
SC-CCC-13.1.1.5	Action Step	Channel Modification	Develop a mitigation policy that requires in-kind replacement of removed large woody debris at a 3:1 ratio.	3	10	CalTrans, Farm Bureau, FEMA, FishNet 4C, Gold Ridge RCD, NRCS, Private Consultants, Private Landowners, Public, Sonoma County						TBD	Costs may vary significantly depending on level of commitment from local government and private landowners. The majority of the costs would likely include local government and consultant staff time.
SC-CCC-13.2	**Objective**	**Channel Modification**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-13.2.1	Recovery Action	Channel Modification	Prevent impairment to floodplain connectivity										

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	
SC-CCC-13.2.1.1	Action Step	Channel Modification	Where feasible, remove obsolete bank stabilization structures from the channel which contribute to channel incision and reduced habitat complexity.	2	10	CalTrans, Farm Bureau, FEMA, FishNet 4C, Gold Ridge RCD, NRCS, Private Consultants, Private Landowners, Public, Sonoma County						TBD	Costs may vary significantly depending on level of commitment from local government and private landowners. The majority of the costs would likely include local government and consultant staff time.
SC-CCC-13.2.1.2	Action Step	Channel Modification	Evaluate undeveloped and developed floodplain property for potential function and conservation easement and/or acquisition potential.	3		RCD, Sonoma County						TBD	Cost accounted for in other action steps.
SC-CCC-13.2.1.3	Action Step	Channel Modification	Conduct rehabilitation activities that restore channels, floodplains and meadows to extend the duration of the summer flow and provide refuge from high winter flows, (see FLOODPLAIN for specific actions).	2	30	CDFG, NOAA RC, NRCS, Private Landowners, Sonoma County, USACE						TBD	Cost accounted for in other action steps.
SC-CCC-13.2.1.4	Action Step	Channel Modification	Promote bio-engineering solutions as appropriate (e.g. carefully evaluate feasibility where critical infrastructure is located) for bank hardening projects.	3	50	CDFG, NMFS PRD, USACE						In-Kind	
SC-CCC-18.1	**Objective**	**Livestock**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-18.1.1	Recovery Action	Livestock	Establish conservative residual dry matter (RDM) target per acre that ensures area is not overgrazed with 1000 lbs RDM (residual dry matter)/acre left at end of grazing season. Remove cattle from pasture before soils dry out.	3		NRCS, RCD						TBD	
SC-CCC-18.2	**Objective**	**Livestock**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-18.2.1	Recovery Action	Livestock	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										
SC-CCC-18.2.1.1	Action Step	Livestock	Encourage riparian restoration to regain riparian corridors damaged from livestock and other causes.	2	30	Farm Bureau, Gold Ridge RCD, NRCS, Private Landowners						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	
SC-CCC-18.2.1.2	Action Step	Livestock	To minimize gully initiation, grazing should be kept at relatively low intensities on steeper slopes	2	60	NRCS, RCD						TBD	
SC-CCC-18.2.1.3	Action Step	Livestock	Where necessary, establish predetermined stream crossings when herding cattle between pastures.	2	60	NRCS, RCD						TBD	
SC-CCC-18.2.1.4	Action Step	Livestock	Address sediment and runoff sources from road networks and other actions that deliver sediment and runoff to stream channels.	2	20	Farm Bureau, Gold Ridge RCD, NRCS, Private Landowners						TBD	
SC-CCC-18.2.2	Recovery Action	Livestock	Prevent impairment to stream hydrology (impaired water flow)										
SC-CCC-18.2.2.1	Action Step	Livestock	Aid landowners willing to fence off riparian areas with development of offstream alternative water sources	2	30	NRCS, RCD						TBD	
SC-CCC-18.2.2.2	Action Step	Livestock	Increase the use of water storage and catchment systems that collect rainwater in the winter for use during the dry summer and fall seasons.	2	30	Farm Bureau, Gold Ridge RCD, NRCS, Private Landowners						TBD	
SC-CCC-18.2.3	Recovery Action	Livestock	Prevent adverse alterations to riparian species composition and structure										
SC-CCC-18.2.3.1	Action Step	Livestock	Provide funding assistance to landowners willing to fence riparian and other sensitive areas (areas prone to erosion) to exclude cattle and sheep. Calf/cow operations should take first priority for riparian fencing programs over steer operations.	2	60	NRCS, RCD						TBD	
SC-CCC-18.2.3.2	Action Step	Livestock	Encourage develop and fund riparian restoration projects to regain riparian corridors damaged from livestock and other causes.	3	30	NRCS, RCD						TBD	
SC-CCC-18.2.3.3	Action Step	Livestock	Substitute continuous season-long use of pastures in favor of rotational grazing strategies to reduce runoff. Short term, seasonal and long term rest from grazing in overgrazed areas would improve soil conditions for native revegetation and land values as well.	3	60	NRCS, RCD						TBD	
SC-CCC-18.2.3.4	Action Step	Livestock	Manage rotational grazing to aid in the reduction of noxious weeds.	3	60	NRCS, RCD						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	
SC-CCC-19.1	**Objective**	**Logging**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-19.1.1	Recovery Action	Logging	Prevent future impacts to habitat complexity										
SC-CCC-19.1.1.1	Action Step	Logging	Acquire key large tracts of forestlands identified as a priority by Federal, State, local government, and non-governmental organizations	3	60	CDFG, NMFS, RCD, Sonoma County, State Parks						TBD	Impossible to anticipate where and how much land will come available for purchase in the future.
SC-CCC-19.1.1.2	Action Step	Logging	Encourage forest management which allows for optimal levels of natural LWD recruitment of larger older trees into stream channels	2	60	Board of Forestry, NMFS, Private Landowners, Sonoma County, State Parks, US EPA						o	Recruitment of LWD to the stream is critical. This action is mainly a policy issue, with little or no direct costs.
SC-CCC-19.1.1.3	Action Step	Logging	Conserve and manage forestlands for older forest stages.	2	60	Board of Forestry, CDFG, NMFS, Sonoma County, State Parks, USEPA						TBD	Costs cannot be determined at this time, due to an unknown number of variables and research priorities.
SC-CCC-19.1.1.4	Action Step	Logging	Assign NMFS staff to conduct THP reviews of the highest priority areas using revised "Guidelines for NMFS Staff when Reviewing Timber Operations: Avoiding Take and Harm of Salmon and Steelhead" (NMFS 2004).	3	2	CalFire, CDFG, NMFS						0	Cost is minimal because NMFS/DFG already participate in meetings the Board of Forestry.
SC-CCC-19.1.1.5	Action Step	Logging	Establish greater oversight and post-harvest monitoring by the permitting agency for operations within high value habitat areas	3	100	NMFS						In-Kind	This action would require funding of a 1/4 time NMFS position. The need for this action may change if the California Forest Practice Rules change and reach a no-take standard.
SC-CCC-19.2	**Objective**	**Logging**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range.**										
SC-CCC-19.2.1	Recovery Action	Logging	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										
SC-CCC-19.2.1.1	Action Step	Logging	Develop a Transportation Plan and adequately upgrade necessary roads, and relocate and/or decommission riparian or unnecessary roads (see ROADS for specific actions/areas)	2	5							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	
SC-CCC-19.2.1.2	Action Step	Logging	Develop a Road Sediment Reduction Plan that prioritizes problem sites and outlines implementation and a timeline of necessary actions.	2	5	Board of Forestry, CalFire, CDFG, Private Landowners, RCD						TBD	
SC-CCC-19.2.1.3	Action Step	Logging	Utilize BMP's to properly construct roads for stormproofing and Avoid the construction of roads in the riparian zone	2									
SC-CCC-22.1	**Objective**	**Residential/Commercial Development**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-22.1.1	Recovery Action	Residential/Commercial Development	Prevent impairment to water quality										
SC-CCC-22.1.1.1	Action Step	Residential/Commercial Development	Implement performance standards in Stormwater Management Plans.	3		RWQCB, Sonoma County							
SC-CCC-22.1.1.2	Action Step	Residential/Commercial Development	Disperse discharge from commercial and residential areas into a spatially distributed network rather than a few point discharges.	3		City Planning, Public Works, Water Agencies							
SC-CCC-22.1.1.3	Action Step	Residential/Commercial Development	Improve water quality where necessary by addressing residential and commercial pollutant sources.	2	10	Private Landowners, Public Works, RCD, RWQCB						tbd	
SC-CCC-22.1.2	Recovery Action	Residential/Commercial Development	Prevent adverse alterations to riparian species composition and structure										
SC-CCC-22.1.2.1	Action Step	Residential/Commercial Development	Develop riparian setbacks/buffers where they do not currently occur, and enforce requirements of local regulations where they do	2		City Planning, Sonoma County						TBD	
SC-CCC-22.1.2.2	Action Step	Residential/Commercial Development	Enforce requirements of local regulations and riparian/setbacks	2		City Planning, Sonoma County							
SC-CCC-22.1.2.3	Action Step	Residential/Commercial Development	Discourage home building or other incompatible land use in areas identified as timber production zones (TPZ).	3		Board of Forestry, CalFire, CDFG, City Planning, Sonoma County							

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	
SC-CCC-22.1.2.4	Action Step	Residential/Commercial Development	Assess efficacy and necessity of ongoing stream maintenance practices and evaluate, avoid, minimize and/or mitigate their impacts to rearing and migrating coho salmon.	3		Sonoma County, Sonoma County Water Agency							
SC-CCC-22.1.2.5	Action Step	Residential/Commercial Development	Address failing septic systems in rural areas	3	10	City Planning, County Planning, RWQCB						tbd	
SC-CCC-22.2	**Objective**	**Residential/Commercial Development**	**Address the present or threatened destruction, modification or curtailment of the species habitat or range**										
SC-CCC-22.2.1	Recovery Action	Residential/Commercial Development	Prevent adverse alterations to riparian species composition and structure										
SC-CCC-22.2.1.1	Action Step	Residential/Commercial Development	Utilize native plants when landscaping and discourage the use of exotic invasives	3		Private Landowners, UC Extension							
SC-CCC-22.2.1.2	Action Step	Residential/Commercial Development	Identify areas at high risk of conversion, and develop incentives and alternatives for landowners that discourage conversion.	2		Private Landowners, Sonoma County							
SC-CCC-22.2.1.3	Action Step	Residential/Commercial Development	Explore the use of conservation easements to provide incentives for private landowners to preserve riparian corridors	2		CDFG, Land Trusts, Private Consultants, Private Landowners						TBD	
SC-CCC-22.2.2	Recovery Action	Residential/Commercial Development	Prevent impairment to watershed hydrology										
SC-CCC-22.2.2.1	Action Step	Residential/Commercial Development	Encourage the use and provide incentives for rooftop water storage and other conservation devices	2		Private Consultants, Private Landowners, Sonoma County							
SC-CCC-23.1	**Objective**	**Roads/Railroads**	**Address the inadequacy of existing regulatory mechanism**										
SC-CCC-23.1.1	Recovery Action	Roads/Railroads	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs ($K)						Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25	Entire Duration	
SC-CCC-23.1.1.1	Action Step	Roads/Railroads	Establish a moratorium on 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.	3	20	Marin County, USACE						In-Kind	Existing authorities of permitting agencies facilitate implementation at minimal costs.
SC-CCC-23.1.1.2	Action Step	Roads/Railroads	Implement DS level recommendations	2									
SC-CCC-23.2	**Objective**	**Roads/Railroads**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-23.2.1	Recovery Action	Roads/Railroads	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										
SC-CCC-23.2.1.1	Action Step	Roads/Railroads	Assess and redesign transportation network to minimize road density and maximize transportation efficiency.	3	10	CalTrans, Marin County						TBD	Costs associated with assessment and redesign cannot be determined at this time, however some assessment has already been conducted.
SC-CCC-23.2.1.2	Action Step	Roads/Railroads	Assess roads in Nolan and Thurston Creeks to identify high priority and high sediment yield sources.	2		Private Consultants, Private Landowners, Public Works, RCD							
SC-CCC-23.2.1.3	Action Step	Roads/Railroads	Implement results of existing sediment source surveys, and assess remaining watershed road networks to eliminate high priority and high sediment yield sources.	2		Private Consultants, Private Landowners, Public Works, RCD							
SC-CCC-23.2.1.4	Action Step	Roads/Railroads	Establish adequate spoils storage sites throughout the watershed so material from landslides and road maintenance can be stored safely away from watercourses. Coordinate these efforts with all landowners in the watershed.	2		Private Landowners, Public Works							
SC-CCC-23.2.1.5	Action Step	Roads/Railroads	Reduce road densities by 10 percent over the next 10 years, prioritizing high risk areas in historical habitats or Core CCC coho salmon watersheds.	2	20	Private Landowners, Sonoma County	25.75	25.75	25.75	25.75		103	This is the only road parameter that received a high or very high threat (density of roads in riparian zone). Cost based for decommissioning 8.6 miles of road network at a rate $12,000/mile.

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	
SC-CCC-23.2.1.6	Action Step	Roads/Railroads	Utilize best management practices for road construction (e.g. Fishnet 4C, 2004; Weaver and Hagans, 1994; Sommarstrom et al., 2002; Oregon Department of Transportation, 1999).	3		Private Landowners, Public Works							
SC-CCC-24.1	**Objective**	**Severe Weather Patterns**	**Address the inadequacy of existing regulatory mechanisms**										
SC-CCC-24.1.1	Recovery Action	Severe Weather Patterns	Prevent impairment to hydrology										
SC-CCC-24.1.1.1	Action Step	Severe Weather Patterns	Work with CDFG, County of Sonoma, State Parks, municipalities, and knowledgeable biologists to develop emergency rules and adopt implementation agreements.	3	20	Cities, Sonoma County, State Parks						TBD	
SC-CCC-24.1.1.2	Action Step	Severe Weather Patterns	Land use zoning should be appropriate to the site and be tolerant to anticipated conditions (e.g., tolerant to frequent flooding).	3	60	Bodega Land Trust, CalFire, Farm Bureau, FEMA, FishNet 4C, Gold Ridge RCD, NRCS, Private Landowners, RWQCB						TBD	Costs will vary significantly depending on site specific conditions and landowner willingness to have roads addressed.
SC-CCC-24.1.1.3	Action Step	Severe Weather Patterns	Work with local governments to incorporate protection of CCC coho salmon in any flood management activity (CDFG 2004).	3	10	CDFG, Cities, FEMA, Gold Ridge RCD, NMFS, Sonoma County, USACE						0	Outreach and education are ongoing, and additional costs are expected to be minimal.
SC-CCC-24.2	**Objective**	**Severe Weather Patterns**	**Address the present or threatened destruction, modification, or curtailment of the species habitat or range**										
SC-CCC-24.2.1	Recovery Action	Severe Weather Patterns	Prevent impairment to hydrology										
SC-CCC-24.2.1.1	Action Step	Severe Weather Patterns	Minimize water use and seek alternatives during droughts.	1	20	Cities, Private Landowners, Sonoma County						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	
SC-CCC-24.2.1.2	Action Step	Severe Weather Patterns	Work with land owners or public agencies to acquire water that would be utilized to minimize effects of droughts.	2	20	Gold Ridge RCD, Private Landowners, Sonoma County						TBD	
SC-CCC-24.2.2	Recovery Action	Severe Weather Patterns	Prevent impairment to water quality (impaired instream temperature)										
SC-CCC-24.2.2.1	Action Step	Severe Weather Patterns	Maintain canopy levels at desirable levels in all streams and restore canopy levels to desirable levels in high value habitat areas (See WATER QUALITY for specific actions/areas	2		CDFG, NOAA RC, Private Landowners, RCD							
SC-CCC-25.1	**Objective**	**Water Diversion/Impoundment**	**Address the present or threatened destruction, modification or curtailment of the species habitat or range**										
SC-CCC-25.1.1	Recovery Action	Water Diversion/Impoundment	Prevent impairment to stream hydrology (impaired water flow)										
SC-CCC-25.1.1.1	Action Step	Water Diversion/Impoundment	Promote off-channel storage to reduce impacts of water diversion (e.g., storage tanks for rural residential users).	2	5	CDFG, Gold Ridge RCD, Private Landowners, RWQCB, Sonoma County						TBD	
SC-CCC-25.1.1.2	Action Step	Water Diversion/Impoundment	Promote the use of reclaimed water for agricultural or other uses.	2	10	Gold Ridge RCD, Private Landowners, RWQCB, Sonoma County, Sonoma County Water Agency						TBD	
SC-CCC-25.1.1.3	Action Step	Water Diversion/Impoundment	Promote water conservation by the public, water agencies, agriculture, private industry, and the citizenry.	2									
SC-CCC-25.1.2	Recovery Action	Water Diversion/Impoundment	Prevent impairment to estuary	2	10	CDFG, NMFS HCD, SWRCB						TBD	
SC-CCC-25.1.2.1	Action Step	Water Diversion/Impoundment	Identify upstream pollution sources which contribute to poor water quality conditions in the estuary	2		County Planning, SWRCB, Water Agencies						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	
SC-CCC-25.1.3	Recovery Action	Water Diversion/Impoundment	Prevent reduced density, abundance, and diversity										
SC-CCC-25.1.3.1	Action Step	Water Diversion/Impoundment	Adequately screen water diversions to prevent juvenile salmonid mortalities.	2									