

# San Vicente Creek



Location	• Santa Cruz County
Watershed Area	• 11.0 Square Miles
Potential Habitat	• 3.4 Stream Miles
Vegetation	• 60% Coniferous, 30% Riparian or Montane Forest, or Shrubland
Erodability	• Moderate to High
Ownership Patterns	• 99% Private; 1% Public
Dominant Land Uses	• Rural Residential, Timber
Housing Density	• Low to Moderate
TMDL Pollutants	• Sediment



Coho salmon smolt from San Vicente Creek. Photo by Chris Berry, City of Santa Cruz Water Department

**San Vicente Creek Coho Salmon:** Persistent – Low Abundance



### Recovery Goals

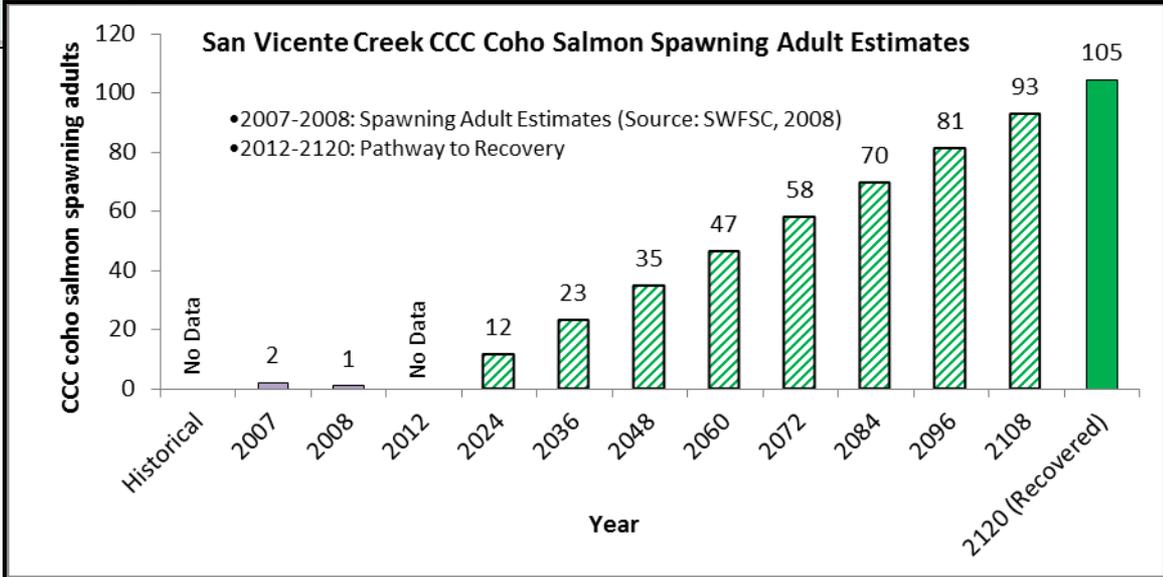
- ✓ Continue SWFSC evaluation of fish response to restoration actions
- ✓ Continue ongoing juvenile sampling efforts and conduct periodic surveys of adult abundance

**San Vicente Creek  
Adult Spawner Targets**

**Downlisting to Threatened  
53**

**Recovery  
105**

**STEELHEAD: YES**  
**CHINOOK SALMON: NO**



# San Vicente Creek

Potential Habitat: 3.4 miles  
Recovery Target: 105 Spawning Adult Coho Salmon

## Current Instream, Watershed and Population Conditions



## Preventing Extinction & Improving Conditions

### Priority 1: Immediate Restoration Actions

- Maintain current LWD, boulders, and other structure providing features to maintain current stream and habitat complexity, pool frequency, and depth
- Remove homeless encampments adjacent to anadromous fish streams where impacts to water quality and abundance are likely
- Ensure lower pond inlet in is adequately monitored and maintained

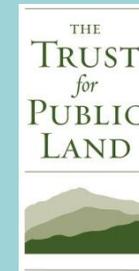
### Priority 2 & 3: Long-Term Restoration Actions

- Monitor population response in off-channel habitats compared to instream habitat
- Implement standardized watershed assessments within sub-watersheds to define limiting factors, identify locations, develop and maintain sediment catchment basins



### Recovery Partners

Coast Dairies, San Vicente TAC,  
NOAA SWFSC



## Future Threats



## Reducing Future Threats

### Priority 1: Immediate Threat Abatement Actions

- Remove invasive exotic vegetation from riparian zones in lower watershed
- Tailings, settling ponds, and other attributes of mining should be secured to ensure sediment, toxins, and other deleterious substances do not enter streams
- Existing areas with floodplains or off-channel habitats should be protected from future development of any kind
- Improve enforcement of Erosion Control Ordinance for private roads
- Conserve open space in contiguous landscapes, protect floodplain areas and riparian corridors, and develop conservation easements

### Priority 2 & 3: Long-Term Threat Abatement Actions

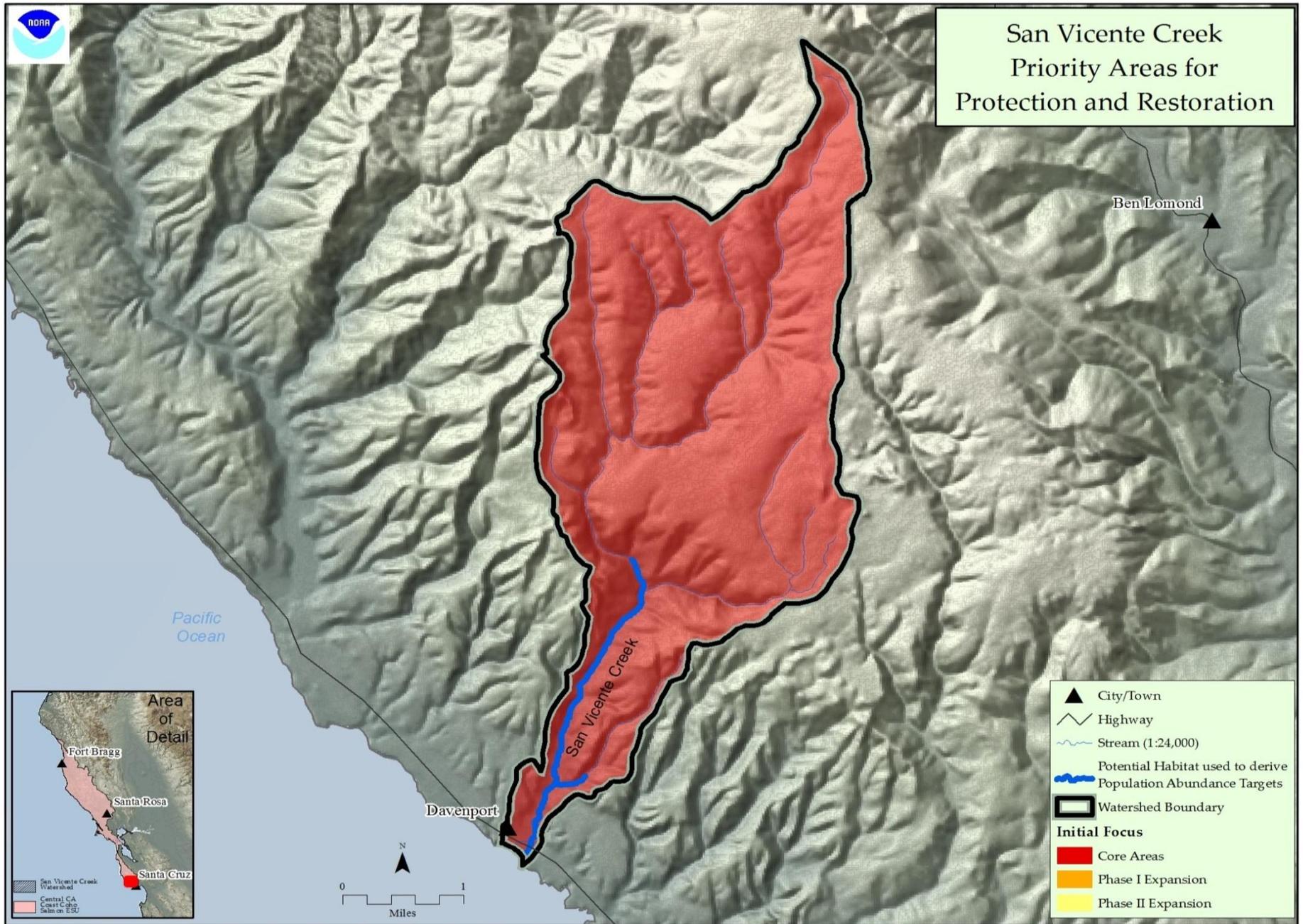
- Discontinue practice of stocking ponds with exotic and predator fish in upper watershed
- Reduce erosion from fire prevention or suppression activities by maintaining existing natural topography
- Abandoned mining areas in the San Vicente watershed should comport to the requirements of the Surface Mine Control and Reclamation Act
- Restore areas impaired by infrastructure near streams, historical floodplains or off channel habitats
- Petition the SWRCB to declare San Vicente Creek fully appropriated during summer and fall months



Passage impediment on San Vicente Creek  
Photo by Jerry Smith, SJSU

## Conservation Highlights

- The San Vicente TAC, Santa Cruz RCD, California Coastal Conservancy, and Balance Hydrologics are working to restore off channel habitats as well as implement side channel LWD projects
- The Santa Cruz RCD and Coastal Conservancy re-established the lower San Vicente pond which now functions as high quality off-channel habitat
- Funding has been awarded for a watershed assessment



**Figure 1: Map of San Vicente Creek**  
 San Vicente Creek

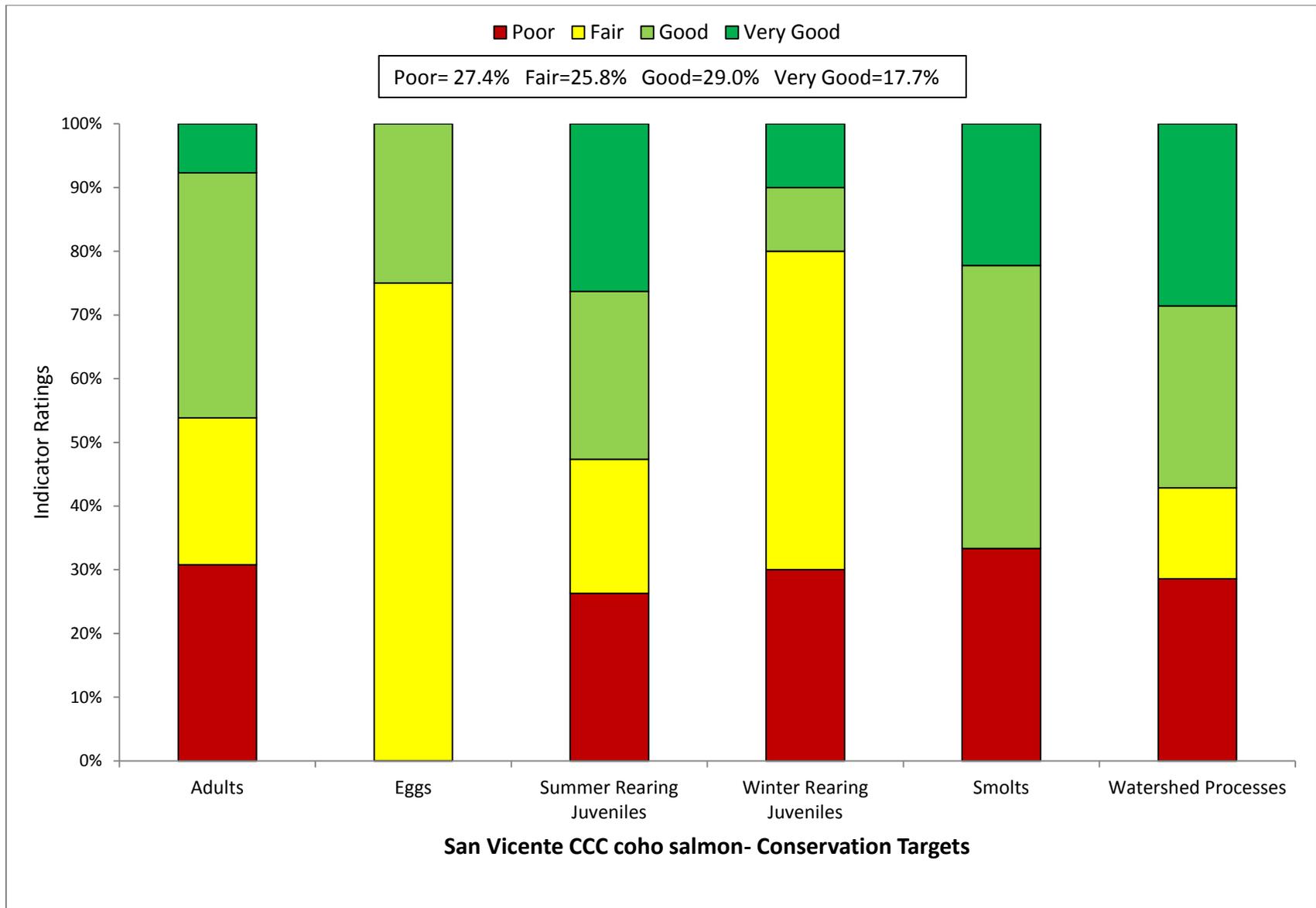


Figure 2: Viability Results by Lifestage

**Table 1: CAP Viability Results ~ San Vicente Creek**

Target	Attribute	Indicator	Result	Rating	Method	Desired Criteria
Adults	Habitat Complexity	Large Wood Frequency (BFW 0-10 meters)	< 4 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/Rifle/Flatwater Ratio	50% streams 4% 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 =50	Good	SEC Analysis/CDFG Data	NMFS Flow Protocol: Risk Factor Score 35-50
Adults	Passage/Migration	Passage at Mouth or Confluence	75% of IP-km to 90% of IP-km accessible	Good	SEC Analysis/CDFG Data	75% of IP-Km to 90% of IP-km
Adults	Passage/Migration	Physical Barriers	100% 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)	NA	0	SEC Analysis/CDFG Data	55 - 69% Class 5 & 6 across IP-km
Adults	Riparian Vegetation	Tree Diameter (South of SF Bay)	70-79% Density rating "D" across IP-km	Fair	SEC Analysis/CDFG Data	≥80% Density rating "D" across IP-km
Adults	Sediment	Quantity & Distribution of Spawning Gravels	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	75% to 90% of streams/ IP-km maintains severity score of 3 or lower	Good	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	Risk Factor Score =58	Fair	SEC Analysis/CDFG Data	NMFS Flow Protocol: Risk Factor Score 35-50

Eggs	Sediment	Gravel Quality (Bulk)	15-17% (0.85mm) and <30% (6.4mm)	Fair	NMFS Instream Flow Analysis	12-14% (0.85mm) and <30% (6.4mm)
Eggs	Sediment	Gravel Quality (Embeddedness)	50 to 74% of streams/ IP-km (>50% stream average scores of 1 & 2)	Fair	NMFS Instream Flow Analysis	75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2)
Summer Rearing Juveniles	Estuary/Lagoon	Quality & Extent	Impaired/non-functional	Poor	NMFS Instream Flow Analysis	Properly Functioning Condition
Summer Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 0-10 meters)	< 4 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	100% of streams/ IP-Km (>49% of pools are primary pools)	Very 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	50% streams 4% 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 = <35	Very Good	NMFS Watershed Characterization	NMFS Flow Protocol: Risk Factor Score 35-50
Summer Rearing Juveniles	Hydrology	Number, Condition and/or Magnitude of Diversions	0/10 IP-km but high magnitude above IP	Good	NMFS Watershed Characterization	0.01 - 1 Diversions/10 IP km
Summer Rearing Juveniles	Passage/Migration	Passage at Mouth or Confluence	>90% of IP-km accessible	Very 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	Very Good	Population Profile/BPJ	75% of IP-Km to 90% of IP-km
Summer Rearing Juveniles	Riparian Vegetation	Canopy Cover	78% of streams/ IP-km with average canopy >85%	Good	SEC or PAD/CDFG Data	75% to 90% of streams/ IP-Km (>85% average stream canopy)
Summer Rearing Juveniles	Riparian Vegetation	Tree Diameter (North of SF Bay)	NA	0	Population Profile/BPJ	55 - 69% Class 5 & 6 across IP-km
Summer Rearing Juveniles	Riparian Vegetation	Tree Diameter (South of SF Bay)	70-79% Density rating "D" across IP-km	Fair	SEC or PAD/CDFG Data	≥80% Density rating "D" across IP-km
Summer Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	50 to 74% of streams/ IP-km (>50% stream average scores of 1 & 2)	Fair	SEC or PAD/CDFG Data	75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2)

Summer Rearing Juveniles	Water Quality	Temperature (MWT)	75 to 89% IP-km (<16 C MWT)	Good	Population Profile/BPJ	75 to 89% IP km (<16 C MWT)
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	>90% of streams/ IP-km maintains severity score of 3 or lower	Very 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)	< 4 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	50% streams 4% 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)	NA	0	Population Profile/BPJ	55 - 69% Class 5 & 6 across IP-km
Winter Rearing Juveniles	Riparian Vegetation	Tree Diameter (South of SF Bay)	70-79% Density rating "D" across IP-km	Fair	SEC Analysis/CDFG Data	≥80% Density rating "D" across IP-km
Winter Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	50 to 74% of streams/ IP-km (>50% stream average scores of 1 & 2)	Fair	SEC Analysis/CDFG Data	75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2)
Winter Rearing Juveniles	Velocity Refuge	Floodplain Connectivity	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% to 74% of streams/ IP-km maintains severity score of 3 or lower	Fair	NMFS Watershed Characterization	75% to 90% of streams/ IP-Km maintains severity score of 3 or lower

Smolts	Estuary/Lagoon	Quality & Extent	Impaired/non-functional	Poor	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	0 Diversions /10 IP-km but high magnitude above IP	Good	Population Profile	0.01 - 1 Diversions/10 IP km
Smolts	Hydrology	Passage Flows	Risk Factor Score =35-50	Good	TRT Spence (2008)	NMFS Flow Protocol: Risk Factor Score 35-50
Smolts	Passage/Migration	Passage at Mouth or Confluence	>90% of IP-km accessible	Very Good	TRT Spence (2008)	75% of IP-Km to 90% of IP-km
Smolts	Smoltification	Temperature	>90% IP-km (>6 and <16 C)	Very Good	TRT Spence (2008)	75-90% IP-Km (>6 and <16 C)
Smolts	Water Quality	Toxicity	No Acute or Chronic	Good	TRT Spence (2008)	No Acute or Chronic
Smolts	Water Quality	Turbidity	75% to 90% of streams/ IP-km maintains severity score of 3 or lower	Good	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	0.80% of Watershed in Impervious Surfaces	Very Good	SEC Analysis	3-6% of Watershed in Impervious Surfaces
Watershed Processes	Landscape Patterns	Agriculture	1.53% of Watershed in Agriculture	Very Good	EPA/RWQCB/NMFS Criteria	10-19% of Watershed in Agriculture
Watershed Processes	Landscape Patterns	Timber Harvest	22% of Watershed in Timber Harvest	Good	Newcombe and Jensen 2003	25-15% of Watershed in Timber Harvest
Watershed Processes	Landscape Patterns	Urbanization	41% 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	2.3 Miles/Square Mile	Good	EPA/RWQCB/NMFS Criteria	1.6 to 2.4 Miles/Square Mile
Watershed Processes	Sediment Transport	Streamside Road Density (100 m)	2.3 Miles/Square Mile	Poor	Newcombe and Jensen 2003	0.1 to 0.4 Miles/Square Mile

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

# Central CA Coast Coho Salmon ~ San Vicente Creek

## ACTIONS FOR RESTORING HABITATS

### 1. Restoration- Estuary

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

1.1.1. **Recovery Action:** Increase the extent of estuarine habitat

1.1.1.1. **Action Step:** Maintain current stream configuration.

### 2. Restoration- Floodplain Connectivity

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

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

2.1.1.1. **Action Step:** Ensure off channel habitats are adequately monitored and maintained. Develop landowner agreements.

### 3. Restoration- Habitat Complexity

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

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

3.1.1.1. **Action Step:** Increase shelter ratings to optimal conditions (>80 pool shelter value) in mainstem San Vicente Creek.

3.1.2. **Recovery Action:** Increase large wood frequency

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

3.1.2.2. **Action Step:** Install properly sized large woody material to viability table targets throughout mainstem San Vicente Creek

3.1.3. **Recovery Action:** Improve pool/riffle/flatwater ratios (hydraulic diversity)

3.1.3.1. **Action Step:** Increase pool frequency 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).

### 4. Restoration- Hydrology

No species-specific actions were developed.

### 5. Restoration- Landscape Patterns

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

5.1.1. **Recovery Action:** Reduce adverse impacts to watershed processes associated with urbanization

- 5.1.1.1. **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

## 6. Restoration- Passage

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

- 6.1.1. **Recovery Action:** Modify or remove physical passage barriers

- 6.1.1.1. **Action Step:** Evaluate Mill Creek dam for potential sediment input, fish passage constraints, and upstream habitat attributes.

- 6.1.1.2. **Action Step:** Remove the Mill Creek dam(s) if no long-term adverse impacts to the downstream fishery are predicted.

- 6.1.1.3. **Action Step:** Evaluate impact of Railroad and Caltrans bore to fish passage during high flow events.

- 6.1.1.4. **Action Step:** Install baffles in the tunnel bore as necessary.

## 7. Restoration- Pool Habitat

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

## 8. Restoration- Riparian

No species-specific actions were developed.

## 9. Restoration- Sediment

No species-specific actions were developed.

## 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 spatial structure and diversity

- 10.1.1.1. **Action Step:** Monitor population response in off-channel habitats compared to instream habitat, similar to work conducted by Environmental Science Associates et al. (2004).

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

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

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

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

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

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

10.2.2.1. **Action Step:** Conduct periodic surveys of adult abundance.

10.2.2.2. **Action Step:** Encourage planting of surplus coho salmon broodstock from the Monterey Bay Salmon and Trout Project into San Vicente Creek.

10.2.2.3. **Action Step:** Fund monitoring actions to evaluate success of adult reintroductions towards salmon recovery

10.2.2.4. **Action Step:** Ensure spawning adults are not harassed when migrating and spawning in the watershed.

10.2.2.5. **Action Step:** Remove homeless encampments adjacent to anadromous fish streams where impacts to water quality and abundance are likely.

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

## **11. Restoration- Water Quality**

No species-specific actions were developed.

## *THREAT ABATEMENT ACTIONS*

### **12. Threat- Agricultural Practices**

No species-specific actions were developed.

### **13. Threat- Channel Modification**

No species-specific actions were developed.

### **14. Threat- Disease/Predation/Competition**

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

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

14.1.1.1. **Action Step:** Remove invasive exotic vegetation from riparian zones.

14.1.1.2. **Action Step:** Work with landowners to discourage planting and dumping of non-native vegetation within the riparian corridor of lower San Vicente Creek.

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

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

14.2.1.1. **Action Step:** Evaluate impacts of fish disease (e.g., black spot) to the San Vicente population.

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

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

14.3.1.1. **Action Step:** Identify and work with landowners in the upper watershed to discontinue practice of stocking ponds with exotic and predator fish .

## 15. Threat- Fire/Fuel Management

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

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

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

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

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

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

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

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

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

## 16. Threat- Fishing/Collecting

No species-specific actions were developed.

## 17. Threat- Hatcheries

No species-specific actions were developed.

## 18. Threat- Livestock

No species-specific actions were developed.

## 19. Threat- Logging

No species-specific actions were developed.

## 20. Threat- Mining

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

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

20.1.1.1. **Action Step:** Tailings, settling ponds, and other attributes of mining should be secured to ensure sediment, toxins, and other deleterious substances do not enter streams through either direct runoff or subsurface flow.

20.1.1.2. **Action Step:** Abandoned mining areas in the San Vicente watershed should comply with all appropriate requirements of the Surface Mine Control and Reclamation Act.

## 21. Threat- Recreation

No species-specific actions were developed.

## 22. Threat- Residential/Commercial Development

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

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

22.1.1.1. **Action Step:** Restore areas impaired by infrastructure near streams, historical floodplains or off channel habitats. Proactively work with landowners on lower San Vicente.

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

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

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

## 23. Threat- Roads/Railroads

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

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

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

23.1.1.2. **Action Step:** Develop a Road Sediment Reduction Plan that prioritizes sites and outlines implementation and a timeline of necessary actions. Begin with a road survey focused on inner gorge roads followed by roads in other settings.

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

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

23.1.1.5. **Action Step:** Use available best management practices for road construction, maintenance, management and decommissioning (e.g. Weaver and Hagens, 1994; Sommarstrom et al., 2002; Oregon Department of Transportation, 1999).

- 23.1.1.6. **Action Step:** For all rural (unpaved) and seasonal dirt roads apply (at a minimum) the road standards outlined in the California Forest Practice Rules.
- 23.1.1.7. **Action Step:** Improve enforcement of Erosion Control Ordinance for private roads. The current Santa Cruz Erosion Control Ordinance has provisions requiring the responsible parties to repair and alleviate erosion problems that are deemed severe. Santa Cruz Planning should create new erosion control staff positions to help coordinate the County's cooperative efforts, but also to conduct inspections and enforcement actions as necessary.
- 23.1.1.8. **Action Step:** Conduct annual inspections of all roads prior to winter. Correct conditions that are likely to deliver sediment to streams.
- 23.1.1.9. **Action Step:** Encourage appropriate restrictions for winter use of unsurfaced roads along rural utility easements; and establish best management practices for clearance within riparian corridors.

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

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

#### **24. Threat- Severe Weather Patterns**

No species-specific actions were developed.

#### **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 watershed hydrology

- 25.1.1.1. **Action Step:** Petition the SWRCB to declare San Vicente Creek fully appropriated during summer and fall months (CDFG 2004).

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

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

- 25.2.1.1. **Action Step:** Develop and enforce stream flow bypass requirements for diversions on the mainstem San Vicente and Mill creeks (CDFG 2004).

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

- 25.2.1.3. **Action Step:** Determine and monitor 1600 program compliance related to water diversions (CDFG 2004).

#### **26. Threat- Watershed Process**

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

26.1.1. **Recovery Action:** Reduce adverse impacts to watershed processes associated with urbanization

26.1.1.1. **Action Step:** Conserve open space in contiguous landscapes, protect floodplain areas and riparian corridors, and develop conservation easements.

26.1.2. **Recovery Action:** Reduce adverse impacts to watershed processes associated with road density

26.1.2.1. **Action Step:** Forest managers should use the Handbook for Forest and Ranch Roads (Weaver and Hagans, 1994) or other similar guidance document to minimize sediment impacts resulting from unsurfaced roads in the upper San Vicente watershed.

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

26.2.1. **Recovery Action:** Reduce adverse impacts to watershed processes associated with urbanization

26.2.1.1. **Action Step:** Discourage counties from rezoning forestlands to rural residential or other incompatible land uses.

**Table 3: Implementation Schedule ~ San Vicente Creek**

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-1.1	Objective	Estuary	Address the present or threatened destruction, modification or curtailment of the species habitat or range										
SVC-CCC-1.1.1	Recovery Action	Estuary	Increase the extent of estuarine habitat										
SVC-CCC-1.1.1.1	Action Step	Estuary	Maintain current stream configuration.	3	100	Caltrans, Railroads							The San Vicente estuary was destroyed due to construction of the railroad and highway crossings. San Vicente Creek flows out to the ocean through a bore constructed in bedrock. Re-establishing an estuary is highly impractical and is not recommended.
SVC-CCC-2.1	Objective	Floodplain Connectivity	Improve over-winter survival by increasing the frequency and functionality of off-channel habitats.										
SVC-CCC-2.1.1	Recovery Action	Floodplain Connectivity	Prevent impairment to floodplain connectivity.										
SVC-CCC-2.1.1.1	Action Step	Floodplain Connectivity	Ensure off channel habitats are adequately monitored and maintained. Develop landowner agreements.	1	10	BLM, CDFG, IWRP, Private Consultants, Santa Cruz RCD	4.00	4.00				8	Cost are reduced due to generally cooperative landowners in the San Vicente Watershed. Most costs are likely associated with staff time. The inlet to San Vicente pond should be monitored, and problems corrected, on a weekly basis. Cost for monitoring estimated at \$4,000/project with a total of two projects.
SVC-CCC-3.1	Objective	Habitat Complexity	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SVC-CCC-3.1.1	Recovery Action	Habitat Complexity	Improve shelter rating										
SVC-CCC-3.1.1.1	Action Step	Habitat Complexity	Increase shelter ratings to optimal conditions (>80 pool shelter value) in mainstem San Vicente Creek.	2	10	IWRP, Santa Cruz County, Santa Cruz RCD	230.55	230.55				461	The most appropriate technique to increase shelter values in San Vicente Creek will likely involve installation of large woody material. Other instream habitat elements could include boulder installation and construction of features to facilitate creation of undercut stream banks. Cost based on treating 4 miles of stream at a cost of \$115,276/mile.
SVC-CCC-3.1.2	Recovery Action	Habitat Complexity	Increase large wood frequency										
SVC-CCC-3.1.2.1	Action Step	Habitat Complexity	Maintain current LWD, boulders, and other structure providing features to maintain current stream complexity, pool frequency, and depth (CDFG 2004).	1	100	CDFG, NMFS, Santa Cruz County							Costs already incorporated as part of shelter rating. Assuming placement of LWD will increase shelter rating and increase LWD frequency.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-3.1.2.2	Action Step	Habitat Complexity	Install properly sized large woody material to viability table targets throughout mainstem San Vicente Creek	1	5	BLM, IWRP, Santa Cruz RCD						TBD	Most LWD structures will need some engineering design and will need to be secured to minimize concerns due to downstream infrastructure including the Highway 1 and railroad bores. Evaluation of potential impacts to water surface elevations per FEMA concerns may also be required.
SVC-CCC-3.1.3	Recovery Action	Habitat Complexity	Improve pool/riffle/flatwater ratios (hydraulic diversity)										
SVC-CCC-3.1.3.1	Action Step	Habitat Complexity	Increase pool frequency 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).	2	10		25.00	25.00				50	The most appropriate technique to increase pool frequency in San Vicente Creek will likely involve installation of large woody material. Other instream habitat elements could include boulder installation into responsive stream reaches. Cost based on treating 2 miles of stream at a rate of \$25,000/mile for LWD placement. If constructing ELJ, assume 10/mile at a rate of 115,276/ELJ for a total of 2,305,000.
SVC-CCC-5.1	Objective	Landscape Patterns	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SVC-CCC-5.1.1	Recovery Action	Landscape Patterns	Reduce adverse impacts to watershed processes associated with urbanization										
SVC-CCC-5.1.1.1	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	2	100	IWRP, NRCS, Private Landowners, Santa Cruz County, Santa Cruz RCD						In-Kind	
SVC-CCC-6.1	Objective	Passage	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SVC-CCC-6.1.1	Recovery Action	Passage	Modify or remove physical passage barriers										
SVC-CCC-6.1.1.1	Action Step	Passage	Evaluate Mill Creek dam for potential sediment input, fish passage constraints, and upstream habitat attributes.	3	10	CDFG, IWRP	1.00	1.00				2	Preliminary information indicates the habitat upstream of the dam is less conducive to coho salmon and more likely conducive to steelhead due to higher stream gradients.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-6.1.1.2	Action Step	Passage	Remove the Mill Creek dam(s) if no long-term adverse impacts to the downstream fishery are predicted.	3	20	CDFG, IWRP, Santa Cruz RCD	125.05	125.05	125.05	125.05		500	Little information available regarding the size of the dam(s) and associated constraints. Cost is likely an over estimate. Removing the dam is unlikely to increase the carrying capacity of the San Vicente coho salmon population, but may benefit steelhead. However this action should not move forward until issues regarding adverse affects to downstream survival of coho salmon is evaluated and determined to be insignificant. Removal costs will vary depending on sediment toxicity and quantity in the dam. Costs need to be weighed against quality and quantity of upstream habitat. Equipment access is likely the most significant constraint.
SVC-CCC-6.1.1.3	Action Step	Passage	Evaluate impact of Railroad and Caltrans bore to fish passage during high flow events.	3	10	CDFG, IWRP, Santa Cruz County Transportation Commission, Santa Cruz RCD							The historical estuary has been lost due to placement of fill and rerouting the stream channel for the railroad and highway crossing. The stream now flows through a tunnel (bore) directly to the ocean. The tunnel should be monitored to ensure no blockages that could impede migration accumulate. To date, no known blockages have occurred in the recent past, but could have significant adverse impacts to a coho year class.
SVC-CCC-6.1.1.4	Action Step	Passage	Install baffles in the tunnel bore as necessary.	3	10	CalTrans, CDFG, Santa Cruz County Transportation Commission	36.00	36.00				72	Cost based on \$71,820/unit.
SVC-CCC-10.1	Objective	Viability	Address the present or threatened destruction, modification, or curtailment of the species habitat or range.										
SVC-CCC-10.1.1	Recovery Action	Viability	Increase spatial structure and diversity										
SVC-CCC-10.1.1.1	Action Step	Viability	Monitor population response in off-channel habitats compared to instream habitat, similar to work conducted by Environmental Science Associates et al. (2004).	2	6	BLM, California Coastal Conservancy, IWRP	105.83	21.17				127	Monitoring is essential for the stream restoration actions in San Vicente in order to evaluate their effectiveness and to allow adaptive management based on predictions of population response. Monitoring should include smolt outmigration estimates from San Vicente pond similar to the efforts of ESA (Environmental Science Associates et al. 2004). Cost for fish/habitat restoration effectiveness monitoring estimated at \$126,758/project.

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
SVC-CCC-10.1.1.2	Action Step	Viability	Preserve the remaining genetic and phenotypic characteristics that promote life history variability through captive broodstock, supplementation, and gene-bank programs to reduce risk of extirpation.	1	6	CDFG, NOAA SWFSC	16.67	3.33				20	Extant coho run in San Vicente creek are likely extremely closely related to the Scott Creek coho population. However, this assumption should be evaluated and genetic resources preserved if important characteristics are identified.
SVC-CCC-10.1.1.3	Action Step	Viability	Develop and implement a monitoring program to evaluate the performance of recovery efforts.	2	10	CDFG, IWRP, NOAA SWFSC	75.00	75.00				150	Monitoring program should be initiated near the completion of restoration efforts. Program should be initiated soon after the initiation of restoration and enhancement actions.
SVC-CCC-10.2	Objective	Viability	<b>Address the inadequacy of existing regulatory mechanisms</b>										
SVC-CCC-10.2.1	Recovery Action	Viability	Increase spatial structure and diversity										
SVC-CCC-10.2.1.1	Action Step	Viability	Implement standardized watershed assessments within sub-watersheds to define limiting factors specific to those areas. Encourage all landowners to develop similar assessment methods.	2	5	CDFG, IWRP, NOAA SWFSC, Santa Cruz RCD						TBD	
SVC-CCC-10.2.2	Recovery Action	Viability	Increase spawner density										
SVC-CCC-10.2.2.1	Action Step	Viability	Conduct periodic surveys of adult abundance.	2	10	CDFG, NOAA SWFSC	56.50	56.50				113	Surveys should assess a minimum of three cohorts. Although a Dependent watershed, San Vicente has recently reestablished its coho run and is a watershed where significant instream restoration actions have occurred and more are planned in the near future. Therefore, surveys of adult abundance (possibly through redd counts using the methods of Gallagher and Gallagher (2005) could provide an index of the last remaining coho populations in the Santa Cruz Mountains Diversity stratum. Cost for annual spawner ground surveys estimated at \$56,470/year.
SVC-CCC-10.2.2.2	Action Step	Viability	Encourage planting of surplus coho salmon broodstock from the Monterey Bay Salmon and Trout Project into San Vicente Creek.	1	100	CDFG, Monterey Bay Salmon and Trout Project, NMFS, NOAA SWFSC						In-Kind	San Vicente is in better relative condition than many other watersheds and with the closure of mining operations it is less likely to be impaired by anthropogenic threats. Supplementation with surplus broodstock should only occur if the coho run in the watershed drops to low levels and habitat conditions remain suitable.
SVC-CCC-10.2.2.3	Action Step	Viability	Fund monitoring actions to evaluate success of adult reintroductions towards salmon recovery	2	20	CDFG, NMFS							

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-10.2.2.4	Action Step	Viability	Ensure spawning adults are not harassed when migrating and spawning in the watershed.	1	100	CDFG Law Enforcement, NMFS OLE, Private Landowners						In-Kind	Harassment of migrating and spawning adults may occur due to the close proximity to the community of Davenport. Encourage citizen patrols as well as patrols by law enforcement agencies to minimize this threat.
SVC-CCC-10.2.2.5	Action Step	Viability	Remove homeless encampments adjacent to anadromous fish streams where impacts to water quality and abundance are likely.	1	100	CDFG Law Enforcement, NMFS OLE, Sheriff Department						In-Kind	Initial efforts should concentrate on the lower pond where previous encampments have been located.
SVC-CCC-10.2.2.6	Action Step	Viability	Continue ongoing juvenile sampling efforts in the watershed. Establish consistent reporting methods to ensure ESU-wide consistency.	2	10	CDFG, NOAA SWFSC	18.50	18.50				37	Cost for annual juvenile surveys estimated at \$18,823/year for Santa Cruz diversity stratum.
SVC-CCC-14.1	Objective	Disease/Predation/Competition	Address the present or threatened destruction, modification, or curtailment of the species habitat or range.										
SVC-CCC-14.1.1	Recovery Action	Disease/Predation/Competition	Prevent adverse alterations to riparian species composition and structure										
SVC-CCC-14.1.1.1	Action Step	Disease/Predation/Competition	Remove invasive exotic vegetation from riparian zones.	1	20	IWRP, Santa Cruz RCD	903	903	903	903		3,610	Initial removal efforts should be concentrated in the lower portion of the watershed which is heavily infested with ivy. Removal will likely entail a sustained effort with periodic follow-ups to ensure suppression. Cost based on treating 1 mile (assume 80 acres/mile in 5% High IP with a 1 mile minimum) at a rate of \$45,114/acre.
SVC-CCC-14.1.1.2	Action Step	Disease/Predation/Competition	Work with landowners to discourage planting and dumping of non-native vegetation within the riparian corridor of lower San Vicente Creek.	3	100	IWRP, Santa Cruz County, Santa Cruz RCD						In-Kind	
SVC-CCC-14.2	Objective	Disease/Predation/Competition	Address disease or predation										
SVC-CCC-14.2.1	Recovery Action	Disease/Predation/Competition	Prevent reduced density, abundance, and diversity										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-14.2.1.1	Action Step	Disease/Predation/Competition	Evaluate impacts of fish disease (e.g., black spot) to the San Vicente population.	3	3	CDFG, IWRP, NMFS, NOAA SWFSC, Private Consultants, Santa Cruz RCD	50.00					50	If possible, provide and implement recommendations to reduce black spot disease to the San Vicente population. Efforts should evaluate potential differences in stream rearing and off-channel rearing fish.
SVC-CCC-14.3	Objective	Disease/Predation/Competition	Address the inadequacy of existing regulatory mechanisms										
SVC-CCC-14.3.1	Recovery Action	Disease/Predation/Competition	Prevent reduced density, abundance, and diversity										
SVC-CCC-14.3.1.1	Action Step	Disease/Predation/Competition	Identify and work with landowners in the upper watershed to discontinue practice of stocking ponds with exotic and predator fish .	2	5	CDFG, IWRP, Santa Cruz County						In-Kind	Efforts should include educational outreach and regulatory oversight. Landowners should be encouraged to remove non-native fish from ponds. Non-native fish must not be placed into fish bearing streams.
SVC-CCC-15.1	Objective	Fire/Fuel Management	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SVC-CCC-15.1.1	Recovery Action	Fire/Fuel Management	Prevent impairment to instream substrate										
SVC-CCC-15.1.1.1	Action Step	Fire/Fuel Management	Immediately implement appropriate sediment control measures following completion of fire suppression while firefighters and equipment are on site.	1	100	CalFire						In-Kind	
SVC-CCC-15.1.1.2	Action Step	Fire/Fuel Management	Reduce erosion from fire prevention or suppression activities by maintaining existing natural topography to the extent possible.	2	100	CalFire						In-Kind	
SVC-CCC-15.1.2	Recovery Action	Fire/Fuel Management	Prevent impairment to stream hydrology (impaired water flow)										
SVC-CCC-15.1.2.1	Action Step	Fire/Fuel Management	Draft water from ponds, lakes, and reservoirs not occupied by listed salmonids when possible. In fish bearing waters excavate active channel areas outside of wetted width to create off-stream pools for water source.	2	100	CalFire							Require all water truck/tenders be fitted with CDFG and NMFS approved fish screens when water is acquired at fish bearing streams. Put up a silt fence or other erosion controls around the water extraction locations. Attempt to avoid significantly lowering stream flows during water drafting.
SVC-CCC-15.2	Objective	Fire/Fuel Management	Address the inadequacy of existing regulatory mechanisms										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-15.2.1	Recovery Action	Fire/Fuel Management	Prevent impairment to water quality										
SVC-CCC-15.2.1.1	Action Step	Fire/Fuel Management	Avoid use of aerial fire retardants and foams within 300 feet of riparian areas throughout the current range of CCC coho salmon.	2	100	BLM, CalFire							This recommendation only applies to situations where lives and structures are not immediately threatened by wildfire.
SVC-CCC-20.1	Objective	Mining	Address the present or threatened destruction, modification or curtailment of the species habitat or range.										
SVC-CCC-20.1.1	Recovery Action	Mining	Prevent impairment to instream substrate										
SVC-CCC-20.1.1.1	Action Step	Mining	Tailings, settling ponds, and other attributes of mining should be secured to ensure sediment, toxins, and other deleterious substances do not enter streams through either direct runoff or subsurface flow.	1	100	CDFG, CEMEX, RWQCB, Santa Cruz County, USEPA						TBD	An assessment of potential site specific threats is needed in order to evaluate total costs. However, this recommendation is typically a standard business practice for mining operation due to a variety of regulatory requirements.
SVC-CCC-20.1.1.2	Action Step	Mining	Abandoned mining areas in the San Vicente watershed should comply with all appropriate requirements of the Surface Mine Control and Reclamation Act.	2	100	BLM, California Geological Survey, CEMEX						TBD	This should be considered a standard business practice. A site specific evaluation is likely needed. Costs of implementing this recommendation should be borne by the quarry operator.
SVC-CCC-22.1	Objective	Residential/Commercial Development	Address the present or threatened destruction, modification or curtailment of the species habitat or range										
SVC-CCC-22.1.1	Recovery Action	Residential/Commercial Development	Prevent impairment to floodplain connectivity.										
SVC-CCC-22.1.1.1	Action Step	Residential/Commercial Development	Restore areas impaired by infrastructure near streams, historical floodplains or off channel habitats. Proactively work with landowners on lower San Vicente.	2	20	CDFG, IWRP, Santa Cruz RCD	63.50	63.50	63.50	63.50		254	Working with landowners in lower San Vicente to remove problematic infrastructure could facilitate creation and enhancement of off-stream habitats beneficial to winter rearing success. Cost based on assumption of 1 project per mile in high IP habitat, total of 2 projects at a cost of \$127,000/acre.
SVC-CCC-22.2	Objective	Residential/Commercial Development	Address the inadequacy of existing regulatory mechanisms.										
SVC-CCC-22.2.1	Recovery Action	Residential/Commercial Development	Prevent impairment to floodplain connectivity										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-22.2.1.1	Action Step	Residential/Commercial Development	Existing areas with floodplains or off channel habitats should be protected from future urban development of any kind.	1	100	FEMA, Santa Cruz County						In-Kind	The lower portion of San Vicente provides important over wintering habitat for coho salmon. Protecting these areas from future development is important for their survival and could provide future opportunities for off-channel restoration projects.
SVC-CCC-23.1	Objective	Roads/Railroads	Address the present or threatened destruction, modification, or curtailment of the species habitat or range										
SVC-CCC-23.1.1	Recovery Action	Roads/Railroads	Prevent impairment to instream substrate/food productivity (impaired gravel quality and quantity)										
SVC-CCC-23.1.1.1	Action Step	Roads/Railroads	Avoid new road construction within floodplains, riparian areas, unstable soils or other sensitive areas until a watershed specific and/or agency/company specific road management plan is created and implemented.	2	10	BLM, CalFire, Santa Cruz County						TBD	
SVC-CCC-23.1.1.2	Action Step	Roads/Railroads	Develop a Road Sediment Reduction Plan that prioritizes sites and outlines implementation and a timeline of necessary actions. Begin with a road survey focused on inner gorge roads followed by roads in other settings.	2	10	CalFire, IWRP	56.00	56.00				112	Cost for road inventory estimated at \$1,056/mile (assume 75% of road network). Cost for sediment assessment estimated at \$13.90/acre (assume 25% of total watershed acres).
SVC-CCC-23.1.1.3	Action Step	Roads/Railroads	Decommission riparian road systems and/or upgrade roads (and skid trails on forestlands) that deliver sediment into adjacent watercourses (CDFG 2004).	3	20	BLM, CalFire, CalTrans, IWRP, Private Landowners, Santa Cruz RCD	8.00	8.00	8.00	8.00		32	Decommissioning approximately ten percent of the riparian roads in San Vicente Creek targets 2.3 miles of riparian road. \$13,680/mile at 2.3 miles. Costs may vary depending on site conditions and other constraints.
SVC-CCC-23.1.1.4	Action Step	Roads/Railroads	Licensed engineering geologists should review and approve grading on inner gorge slopes.	2	5	CalFire, California Geological Survey, CalTrans, Santa Cruz County						In-Kind	The cost estimate is low because NMFS believes relatively little grading will occur due to the small size of the watershed.
SVC-CCC-23.1.1.5	Action Step	Roads/Railroads	Use available best management practices for road construction, maintenance, management and decommissioning (e.g. Weaver and Hagans, 1994; Sommarstrom et al., 2002; Oregon Department of Transportation, 1999).	2	100	BLM, CEMEX, Private Landowners, Santa Cruz County, Santa Cruz RCD						0	These BMPs should be incorporated into all road management practices and may result in long term cost savings due to lower maintenance and repair costs.

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-23.1.1.6	Action Step	Roads/Railroads	For all rural (unpaved) and seasonal dirt roads apply (at a minimum) the road standards outlined in the California Forest Practice Rules.	2	100	CalFire, Private Landowners						In-Kind	
SVC-CCC-23.1.1.7	Action Step	Roads/Railroads	Improve enforcement of Erosion Control Ordinance for private roads. The current Santa Cruz Erosion Control Ordinance has provisions requiring the responsible parties to repair and alleviate erosion problems that are deemed severe. Santa Cruz Planning should create new erosion control staff positions to help coordinate the County's cooperative efforts, but also to conduct inspections and enforcement actions as necessary.	1	5	Santa Cruz County						In-Kind	The number of visits per year to this important watershed will likely be minimal due to the small size of the watershed. Additional costs will be necessary to meet the obligations in the ordinance in other watersheds and this expense could be spread out across the County.
SVC-CCC-23.1.1.8	Action Step	Roads/Railroads	Conduct annual inspections of all roads prior to winter. Correct conditions that are likely to deliver sediment to streams.	2	100	BLM, CalFire, CalTrans, CEMEX, Private Landowners, Santa Cruz County						In-Kind	Hydrologically disconnect roads in the watershed. This should be considered a standard business practice for all landowners and managers in the watershed.
SVC-CCC-23.1.1.9	Action Step	Roads/Railroads	Encourage appropriate restrictions for winter use of unsurfaced roads along rural utility easements; and establish best management practices for clearance within riparian corridors.	2	100	CalFire, PG&E, Santa Cruz County						In-Kind	
SVC-CCC-23.1.2	Recovery Action	Roads/Railroads	Prevent impairment to watershed hydrology										
SVC-CCC-23.1.2.1	Action Step	Roads/Railroads	Size culverts to accommodate flashy, debris-laden flows and maintain trash racks to prevent culvert plugging and subsequent road failure.	2	100	CalFire, RPFs, RWQCB, Santa Cruz County						In-Kind	All new and replacement culverts should be sized to accommodate a 100 year flow event. This recommendation applies primarily to culverts on road crossings under timber harvest in the upper portion of the watershed above anadromy.
SVC-CCC-25.1	Objective	Water Diversion/Impoundment	Address the present or threatened destruction, modification or curtailment of the species habitat or range										
SVC-CCC-25.1.1	Recovery Action	Water Diversion/Impoundment	Prevent impairment to watershed hydrology										

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs (\$K)					Entire Duration	Comments
							FY 1-5	FY 6-10	FY 11-15	FY 16-20	FY 21-25		
SVC-CCC-25.1.1.1	Action Step	Water Diversion/Impoundment	Petition the SWRCB to declare San Vicente Creek fully appropriated during summer and fall months (CDFG 2004).	2	5	CDFG, NMFS, Public, Santa Cruz County						In-Kind	The County of Santa Cruz and the California Coastal Commission stated in their conditional use permits for CEMEX construction of a new kiln in the General Plan, that San Vicente Creek is a fully allocated watershed. With the recent closure of CEMEX less water should be diverted from the watershed. Town of Davenport water use should comply with State law.
SVC-CCC-25.2	Objective	Water Diversion/Impoundment	Address the inadequacy of existing regulatory mechanisms										
SVC-CCC-25.2.1	Recovery Action	Water Diversion/Impoundment	Prevent impairment to watershed hydrology										
SVC-CCC-25.2.1.1	Action Step	Water Diversion/Impoundment	Develop and enforce stream flow bypass requirements for diversions on the mainstem San Vicente and Mill creeks (CDFG 2004).	2	5	CDFG, NMFS HCD, Santa Cruz County, SWRCB	72.00					72	This cost will require transects and measurements of streamflow in the lower reaches over a multiple year period. Costs may vary depending on gauging requirements per section 1600 stream diversion requirements. Bypass flow requirements should assess impacts to both coho and steelhead during all life stages. Cost for stream flow model estimated at \$71,825/project.
SVC-CCC-25.2.1.2	Action Step	Water Diversion/Impoundment	If predicted flows are below a level considered critical to maintain viable rearing habitat for salmonids, measures to reduce water consumption should be initiated through conservation programs.	1	100	CDFG, CDFG Law Enforcement, NMFS OLE, NMFS PRD, SWRCB						TBD	Consider requiring federal and state incidental take permits for water diversions if determined to adversely affect coho salmon in San Vicente Creek. Cost likely accounted for in above action step.
SVC-CCC-25.2.1.3	Action Step	Water Diversion/Impoundment	Determine and monitor 1600 program compliance related to water diversions (CDFG 2004).	3	1	CDFG, CDFG Law Enforcement						In-Kind	
SVC-CCC-26.1	Objective	Watershed Process	Address the present or threatened destruction, modification or curtailment of the species habitat or range										
SVC-CCC-26.1.1	Recovery Action	Watershed Process	Reduce adverse impacts to watershed processes associated with urbanization										
SVC-CCC-26.1.1.1	Action Step	Watershed Process	Conserve open space in contiguous landscapes, protect floodplain areas and riparian corridors, and develop conservation easements.	1	100	Santa Cruz County, Santa Cruz County Land Trust						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	
SVC-CCC-26.1.2	Recovery Action	Watershed Process	Reduce adverse impacts to watershed processes associated with road density									
SVC-CCC-26.1.2.1	Action Step	Watershed Process	Forest managers should use the Handbook for Forest and Ranch Roads (Weaver and Hagens, 1994) or other similar guidance document to minimize sediment impacts resulting from unsurfaced roads in the upper San Vicente watershed.	3	100	CalFire						In-Kind
SVC-CCC-26.2	Objective	Watershed Process	Address the inadequacy of existing regulatory mechanisms									
SVC-CCC-26.2.1	Recovery Action	Watershed Process	Reduce adverse impacts to watershed processes associated with urbanization									
SVC-CCC-26.2.1.1	Action Step	Watershed Process	Discourage counties from rezoning forestlands to rural residential or other incompatible land uses.	1	100	Public, Santa Cruz County						In-Kind