SCOTT CREEK

Scott Creek

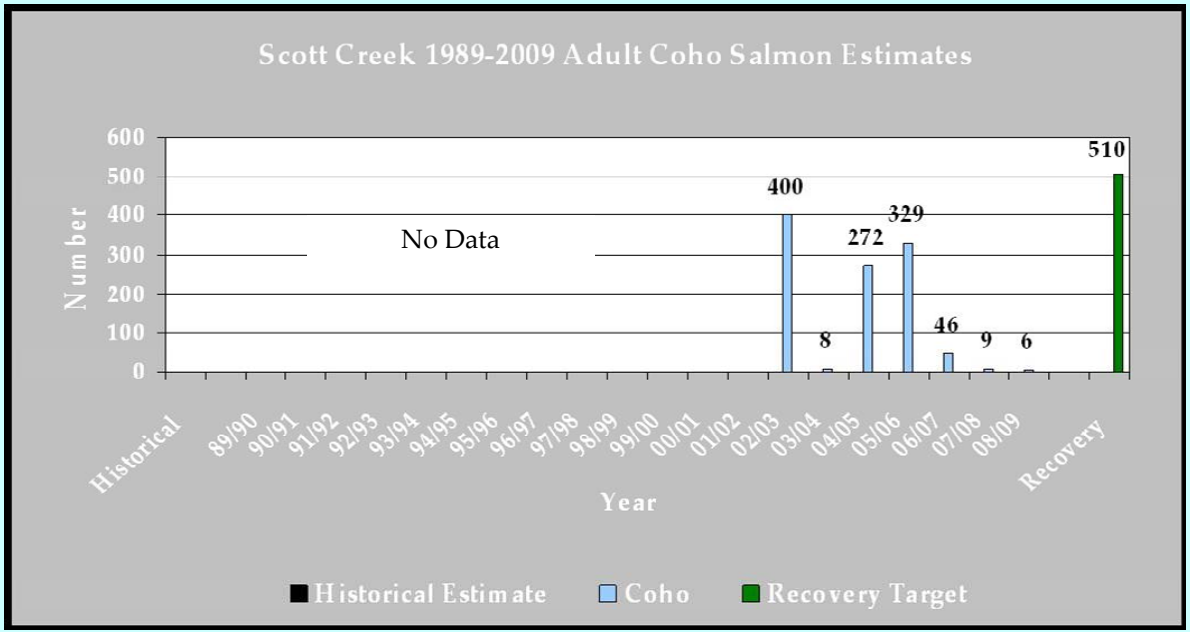
Dependent Population
15.0 IP-km of potential coho salmon habitat
Coho salmon and steelhead present

Scott Creek drains approximately 30 square miles of the Santa Cruz Mountains in northwestern Santa Cruz County. Scott Creek enters the Pacific Ocean approximately two miles northwest of Davenport and 12 miles northwest of the City of Santa Cruz. About 70 percent of the Scott Creek watershed is coniferous forest and about 30 percent of the watershed is either shrubland, grasslands, or montane or riparian hardwood forest. The Scott Creek watershed has moderate to high erodibility after considering slope, precipitation, and the susceptibility of failure of underlying geology. Ninety-five percent of the Scott Creek watershed is in private ownership; the remaining five percent is state and military owned lands. Land uses in the watershed include forestry, rural residential development, and agriculture. Within the past ten years, about six percent of the Scott Creek watershed has been under timber harvest plans. There are two dams within the watershed that impede or block salmon migration, and an additional 21 other barriers to salmon migration caused by road crossings, diversions, and natural structures. Scott Creek is the most important creek in the Santa Cruz diversity stratum because it maintains the largest remaining coho salmon populations and possibly individuals from all three year classes. Monterey Bay Salmon and Trout Project, in cooperation with Big Creek Timber Company, SWFSC, and DFG run a critical hatchery that is used for the coho broodstock program in the Scott Creek watershed. Unfortunately, over 7,000 acres of this watershed burned during the 2009 Lockheed fire, placing the remaining coho in severe jeopardy from increased erosion with the upcoming winter rains.

Scott Creek
Photo by Jerry Smith, SJSU

The Watershed at a Glance

Spawning Quantity & Quality	**FAIR to VERY GOOD**
Summer Water Temperatures	**FAIR**
Depth & Shelter of Pools	**POOR**
Large Wood Frequency	**POOR**
Riparian Canopy	**GOOD**
Off channel/Floodplain Quality	**POOR to GOOD**
Estuary Function	**POOR**



Scott Creek

Recovery Target: 510 Adult Coho Salmon

Increasing the survival of coho salmon

requires **protecting** all individuals from threats that are jeopardizing coho salmon. The highest ranked threats are:

- Roads and railroads
- Logging and Wood Harvesting
- Storms and Flooding
- Channel Modification
- Droughts
- Agricultural Practices
- Climate Change

Preventing the extinction of coho salmon

means **restoring** many key habitat attributes within the Scott Creek watershed that are in poor condition. The highest priorities for restoration are to:

- Improve fire and fuel management practices
- Enhance riparian buffers
- Preserve existing forest lands
- Improve channel modifications
- Improve planning for natural disasters
- Decrease the number of roads near the stream and reduce impacts from remaining roads

Scott creek
Photo by Jerry Smith, SJSU

Advancing recovery of coho

salmon in Scott Creek requires these priority **recovery actions:**

- Promote restoration projects designed to create or restore alcove, backchannel, ephemeral tributary, or seasonal pond habitats.
- Maintain and promote conservation measures including Kingfisher Flat Hatchery per Dept. of Fish and Game and NMFS guidelines
- Promote, via technical assistance and/or regulatory of water use affecting the natural hydrograph, development of alternative water sources, and implementation of diversion regimes protective of the natural hydrograph
- Conduct erosion site assessments to identify chronic sediment sources and assess runoff sources from networks.
- Addressing and remediating the devastating effects resulting from the 2009 Lockheed fire.

. . . in these **core areas:** Scott Creek, Big Creek, and Little Creek planning watersheds

Conservation Highlights

- Santa Cruz RCD, sediment remediation project
- Scott Creek watershed assessment
- Ongoing actions include Monterey Bay Salmon and Trout Project broodstock program and NOAA SWFSC population estimates.

We Need Your Photo Here

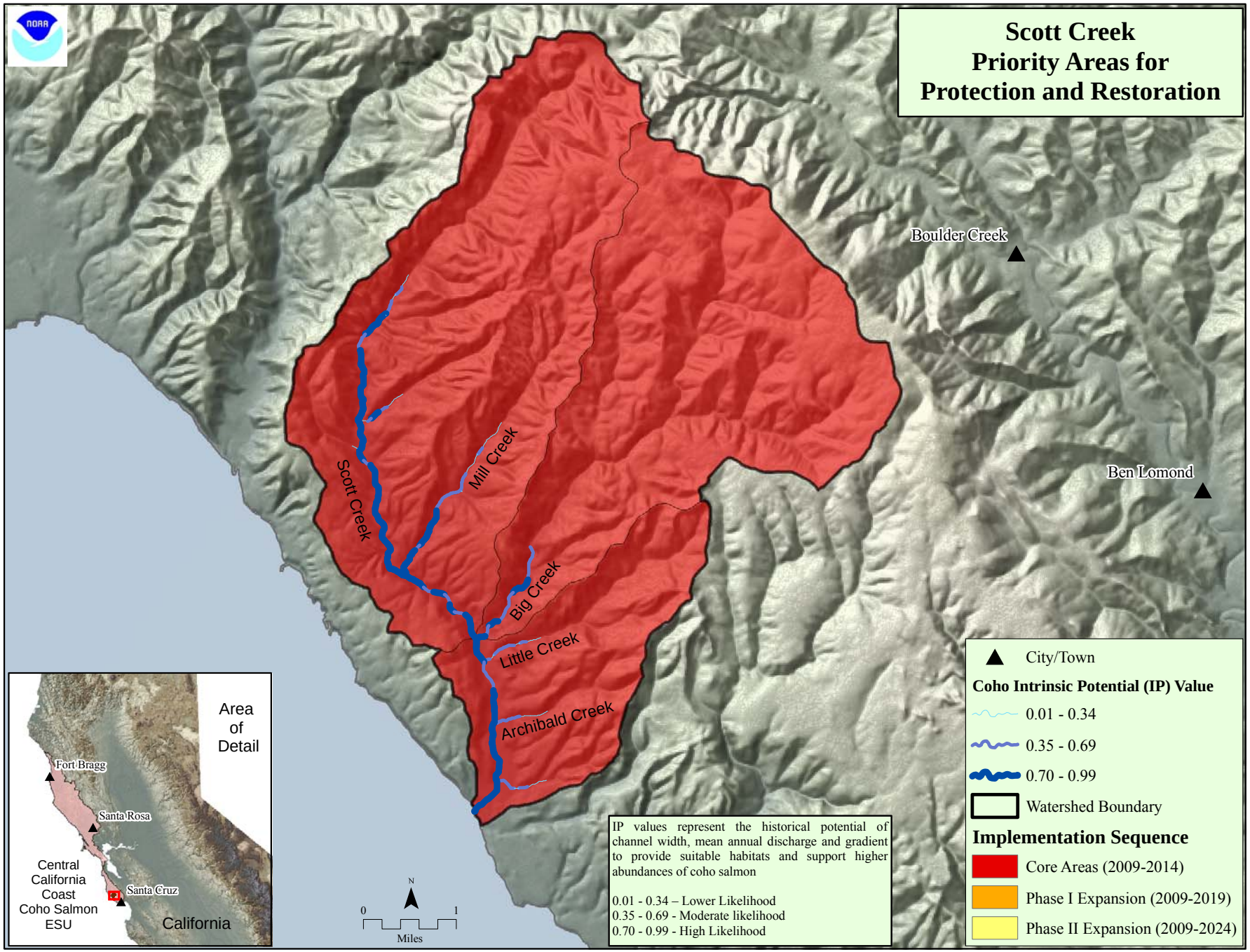
Scott Creek
Photo © Your Name Here, AFFIL

Recovery Partners

Scott Creek Watershed Counsel
Monterey Bay Salmon and Trout Project
CalPoly
Big Creek
NOAA SWFSC
Caltrans
CalFire

Immediate Needs

Address sediment impacts following the 2009 Lockheed Fire √
Install large wood debris √


Scott Creek
Priority Areas for
Protection and Restoration
Boulder Creek
Ben Lomond
Scott Creek
Mill Creek
Big Creek
Little Creek
Archibald Creek
City/Town
Coho Intrinsic Potential (IP) Value
0.01 - 0.34
0.35 - 0.69
0.70 - 0.99
Watershed Boundary
Implementation Sequence
Core Areas (2009-2014)
Phase I Expansion (2009-2019)
Phase II Expansion (2009-2024)
IP values represent the historical potential of channel width, mean annual discharge and gradient to provide suitable habitats and support higher abundances of coho salmon
0.01 - 0.34 – Lower Likelihood
0.35 - 0.69 - Moderate likelihood
0.70 - 0.99 - High Likelihood
N
0
1
Miles
Area of Detail
Fort Bragg
Santa Rosa
Santa Cruz
Central California Coast Coho Salmon ESU
California

CCC Coho Salmon
Scott Creek
CAP Viability Table Results

Analyst	Source	Result	Rating	Target	Habitat Attribute	Indicator	Poor	Fair	Good	Very Good
Flow Panel	Decision Matrix	35-50	Good	Spawning Adults	Hydrology	Passage Flows	>75 (score)	51-75	35-50	<35
SEC	PSMFC Database	100%	Very Good	Spawning Adults	Passage	Physical Barriers	<50% of IP-km	50-70% of IP-km	70-90% of IP-km	>90% of IP-km
NCWAP	Decision Matrix	30-60 days	Fair	Spawning Adults	Passage	Passage at Mouth	<30 days	30-60 days	60-90 days	>90 days
SEC	CDFG HAB 8	8729 m^2	Very Good	Spawning Adults	Sediment	Amount of Gravel*	<100 m^2	100-800 m^2	800-1600 m^2	>1600 m^2
NMFS	Best Prof. judgment	5-10%	Fair	Spawning Adults	Viability	Freshwater Harvest	>10% of pop.	5-10%	<5%	
Flow Panel	Decision Matrix	33	Very Good	Eggs	Hydrology	Instantaneous Condition	>75 (score)	51-75	35-50	<35
Flow Panel	Decision Matrix	83	Poor	Eggs	Hydrology	Redd Scour	>75 (score)	51-75	35-50	<35
SEC	Many Sources	NA	Poor	Eggs	Sediment	Gravel Quality	>17% 0.85mm and or >30% 6.3mm	15-17% 0.85	12-14% 0.85mm and or <30% 6.3mm	<12% 0.85
SEC	CDFG HAB 8	NA	NA	Eggs	Sediment	Gravel Quality (Embeddedness)	<25% of scores 1s&2s	25-50% of scores 1s&2s	>50% of scores 1s&2s	
Flow Panel	Decision Matrix	75	Fair	Summer Rearing	Hydrology	Baseflow	>75 (score)	51-75	35-50	<35
SEC	CDFG HAB 8	43.5	Poor	Summer Rearing	Pool Habitat	Shelter Rating	<60 avg. rating	60-80	80-100	>100
SEC	CDFG HAB 8	5%	Poor	Summer Rearing	Pool Habitat	Primary Pools	<30% pools by length	30-40%	40-50%	>50%
SEC/NMFS	Many Sources	NA	Fair	Summer Rearing	Water Quality	Temperature	>30% of IP > 17 C MWMT	Does not meet Good or Very Good	30-60% of IP < 15C MWMT	>60% of IP < 15C MWMT
SEC	CDFG HAB 8	43.5	Poor	Winter Rearing	Floodplain	Complex Habitat**	<50% Connected	50-80% connected	>80% connected	
NMFS	NCWAP	Poor	Poor	Smolts	Estuary	Estuary				
Flow Panel	Decision Matrix	67	Good	Smolts	Hydrology	Passage Flows	>75 (score)	51-75	35-50	<35
SEC	SWRCB	2.67/10 IP-km	Fair	Smolts	Passage	# of Diversions**	>5 / 10 IP km	1.1-5	0.01-1	0
SEC	CDFG HAB 8	43.5	Poor	Multiple Life Stages	Pool Habitat	Shelter Rating	<60 avg. rating	60-80	80-100	>100
NMFS	Best Prof. judgment	>80%	Good	Multiple Life Stages	Floodplain	Floodplain Connectivity	<50%	50-80%	>80%	not defined
NMFS	CDF CWHR	54%	Good	Multiple Life Stages	Hydrology	Stand Age			>40 years old	
SEC	NLCDB	0.19%	Very Good	Multiple Life Stages	Hydrology	Impervious Surfaces	>12.01% of WS by area	7.01-12%	3.01-7%	0-3%
SEC	FMMP	0.20%	Good	Multiple Life Stages	Land disturbance	Agriculture	>30% of WS by area	10-30%	0.1-10%	<0.1%
NMFS	CDF THP Dataset	6%	Very Good	Multiple Life Stages	Land disturbance	Timber Harvest	>35% of WS by area	25 - 35%	10 - 25%	<10%
SEC	Best Prof. judgment	NA	Poor	Multiple Life Stages	Pool Habitat	LWD Freq. (BFW 0-10)	<4key pcs/100m	4-6/100m	6-11/100m	>11/100m
SEC	Many Sources	4.4	Poor	Multiple Life Stages	Pool Habitat	LWD Freq. (BFW 10-100)	<1/100m	1-1.3/100m	1.3-4/100m	>4/100m
NMFS	CDF CWHR	>50%	Good	Multiple Life Stages	Riparian Veg.	Species Composition	<25%	25-50%	>50%	Historical Conditions
NMFS	CDF CWHR	61%	Good	Multiple Life Stages	Riparian Veg.	DBH	<39% Class 5 and 6	40-54%	55-69%	>69%
SEC	CDFG HAB 8	92%	Good	Multiple Life Stages	Riparian Veg.	Canopy Cover	<75 % avg. over IP-km	75-85%	85-95%	>95%
NMFS	CDF THP Dataset	3 mi/sq.mi.	Fair	Multiple Life Stages	Sediment Transport	Road Density	>3 miles/sq. mile	3 to 2.5	2.5 to 1.6	<1.6
NMFS	CDF THP Dataset	2.8 mi/sq.mi.	Poor	Multiple Life Stages	Sediment Transport	Road density 100	>1 miles/sq. mile	1-0.5	0.5-0.1	<0.1
NMFS	Many Sources	Fair	Fair	Multiple Life Stages	Water Quality	Toxicity	Acute	Sublethal or Chronic	No Acute or Chronic	No evidence of toxins or Contaminants
NMFS	Best Prof. judgment	<1 per IP-km	Poor	Spawning Adults	Viability	Adult Density	<1 per IP-km	1-20 per IP-km	20-40 per IP-km	>40 per IP-km
NMFS	Best Prof. judgment	0.2-0.5 fish/m^2	Fair	Summer Rearing	Viability	Juvenile Density	< 0.2 fish/m^2	0.2-0.5 fish/m^2	0.5-1.0 fish/m^2	>1.0 fish/m^2
NMFS	Best Prof. judgment	35-50%	Good	Summer Rearing	Viability	Juvenile Distribution	<20% IP-km occupied	20-34%	35-50%	>50%

See Appendix C for a full description of the analysis methods for the Viability Table Reports

* = watershed specific numbers

** = Ratings defined by the distribution of results

Scott Creek Threats Across Targets		Spawning Adults	Eggs	Summer Rearing Juveniles	Winter Rearing Juveniles	Smolts	Multiple Life Stages			Overall Threat Rank
Project-specific threats		1	2	3	4	5	6	7	8	
1	Fire and Fuel Management	Medium	High	High	High	High	Medium			High
2	Roads and Railroads	High	High	High	Medium	Low	High			High
3	Logging and Wood Harvesting	Medium	Medium	Very High	Medium	Low	Medium			High
4	Storms and Flooding	High	High	Medium	Medium	Low	High			High
5	Channel Modification	Medium	Medium	High	Medium	High	Medium			High
6	Droughts	Medium	Medium	High	Medium	High	Medium			High
7	Agricultural Practices	Medium	Medium	High	Medium	Medium	Medium			High
8	Climate Change	High	Medium	Medium	Medium	Medium	Medium			High
9	Recreational Areas and Activities	Medium	Low	Medium	Medium	Medium	Medium			Medium
10	Residential and Commercial Development	Medium	Medium	Medium	Medium	Low	Medium			Medium
11	Livestock Farming and Ranching	Medium	Low	Medium	Medium	Low	Medium			Medium
12	Mining	Medium	Low	Medium	Medium	Low	Medium			Medium
13	Water Diversion and Impoundment	Medium	Low	Medium	Medium	Low	Medium			Medium
14	Disease, Predation, and Competition	-	-	Low	-	Medium	-			Low
15	Hatcheries and Aquaculture	Low	-	Low	Low	Low	Low			Low
16	Fishing and Collecting	Low	-	Low	Low	Low	-			Low
Threat Status for Targets and Project		High	High	Very High	High	High	High	-	-	Very High

Table

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs ($K)						Comments
							FY1	FY2	FY3	FY4	FY5	Entire Duration	
ScC-A-1.1	Objective	Estuary	Restore and enhance estuary habitat in the watershed.										
ScC-A-1.1.1	Recovery Action	Estuary	Develop Estuary Protection and Enhancement Guidelines to maintain estuary function and provide information for estuary restoration.										
ScC-A-1.1.1.1	Action Step	Estuary	Restore estuarine habitat and the associated wetlands and sloughs by providing fully functioning habitat (DFG 2004).	3	20	California Coastal Conservancy, CalPoly, CalTrans, CDFG, NMFS, NRCS, Santa Cruz County, Santa Cruz RCD, State Parks, USACE						TBD	Lower priority for coho but will benefit smolt transition and adult upmigration.
ScC-A-1.1.1.2	Action Step	Estuary	Remove structures impairing or reducing the historical tidal prism where feasible and where benefits to coho salmon and/or the estuarine environment are predicted. Evaluate benefits to lagoon tidal prism from the proposed bridge replacement for the US Route 1 bridge over Scott Creek lagoon.	1	10	CalPoly, CalTrans, CDFG, FEMA, NMFS, NOAA SWFSC, RWQCB, Santa Cruz County, Santa Cruz RCD, USACE, USFWS						TBD	Cost cannot be determined due to the unknown number of projects in the area and landowner willingness to assist in estuary restoration. It is likely that other projects will occur opportunistically over the next 60 years recovery horizon and should implemented when landowners are willing and funding is available. Caltrans is currently evaluating bridge replacement - differentiating between anticipated replacement costs and additional actions for coho recovery benefits can not be estimated at this time due to uncertainty regarding Caltrans preferred alternative. Replacement of the bridge offers a rare opportunity to restore two sharp bends to the lower channel and replace the leveed and straightened channel.
ScC-A-1.1.1.3	Action Step	Estuary	Enhance and restore estuary function by improving complex habitat features.	2	30	CalPoly, CalTrans, CDFG, NMFS, RWQCB, Santa Cruz RCD, USACE, USFWS						TBD	Improving complex habitat features will provide salt-water transition opportunities for smolts and improve feeding habitats.
ScC-A-1.1.1.4	Action Step	Estuary	Post durable and attractive interpretive signage at the beach to discourage casual breaching of the lagoon sandbar.	2	2	CalTrans, CDFG Law Enforcement, NMFS OLE, State Parks	0.15	0.15				0	
ScC-A-2.1	Objective	Floodplain	Improve over-winter survival by increasing the frequency and functionality of off-channel habitats.										
ScC-A-2.1.1	Recovery Action	Floodplain	Create flood refuge habitat, such as hydrologically connected floodplains with riparian forest, or remove or setback levees, and use streamway concept where appropriate.										
ScC-A-2.1.1.1	Action Step	Floodplain	Encourage counties to develop property easement acquisition funds and acquire grant monies to purchase eroding private properties in riparian corridors or properties subject to frequent flooding though a buyout program.	2	60	FEMA, Private Landowners, Santa Cruz County						TBD	Costs would vary and would depend on landowner participation. A long term cost savings in some locations would likely result from implementation of this action.
ScC-A-2.1.1.2	Action Step	Floodplain	Target habitat restoration and enhancement that will function between winter base flow and flood stage.	2	15	Big Creek Lumber Co., California Coastal Conservancy, CalPoly, CDFG, NMFS, NOAA RC, Santa Cruz RCD, Scotts Creek Watershed Council						TBD	Costs cannot be determined until riparian habitats are evaluated and the proper measures are identified.

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs ($K)						Comments
							FY1	FY2	FY3	FY4	FY5	Entire Duration	
ScC-A-2.1.1.3	Action Step	Floodplain	Breech existing levees in lower Scott Creek watershed to increase flood-flow detention and promote flood-tolerant land uses. Evaluate feasibility of removing the lower levee constructed by Caltrans in 1940 for the Highway 1 bridge over Scott Creek.	1	10	CalPoly, CalTrans, FEMA, NMFS, NOAA RC, NRCS, Santa Cruz RCD, Scotts Creek Watershed Council, USACE, USFWS	40.00	40.00	40.00	40.00	40.00	400	Costs may vary depending on restoration methods used. Total removal would be more expensive than estimated here. Strategic breaching would be less expensive. Costs could be offset if adopted by Caltrans as a mitigation measure.
ScC-A-2.1.2	Recovery Action	Floodplain	Promote restoration projects designed to create or restore alcove, backchannel, ephemeral tributary, or seasonal pond habitats.	1	20	Big Creek Lumber Co., CalFire, CalPoly, CDFG, NMFS, NRCS, Private Landowners, RWQCB, Santa Cruz RCD, Scotts Creek Watershed Council, USACE						TBD	Costs will vary depending on site conditions, restoration techniques, and landowner participation. Scott Creek does not have a restoration plan that targets these habitat options and therefore costs cannot be determined at this time.
ScC-A-3.1	Objective	Hydrology	Improve survival at all life stages by restoring the historical spatial and temporal pattern of surface flows throughout spawning, rearing, and migration areas.										
ScC-A-3.1.1	Recovery Action	Hydrology	Work with SWRCB and landowners to improve over summer survival of juveniles by re-establishing summer baseflows (from July 1 to October 1) in rearing reaches that are currently impacted by water use.										
ScC-A-3.1.1.1	Action Step	Hydrology	Develop more efficient and coordinated use of water resources to provide increased supply, restore groundwater levels, and increase dry weather baseflows through conjunctive management, use of reclaimed wastewater, and increased storage or utilization of excess winter stream flows.	1	3	California Coastal Conservancy, CalPoly, Farm Bureau, Monterey Bay Salmon and Trout Project, NMFS, NRCS, Scotts Creek Watershed Council, SWRCB, Trout Unlimited	33.33	33.33	33.33			100	Costs may vary depending on landowner participation. Cost estimate is based on full landowner participation and necessary coordination by landowner representatives. Cost estimate does not include improvements to infrastructure or development of storage facilities. These costs cannot be estimated until a water availability analysis is conducted.
ScC-A-3.1.1.2	Action Step	Hydrology	Work with the SWRCB to develop and enforce stream flow bypass requirements for diversions in mainstem Scott Creek, Big Creek, and Mill Creek (DFG 2004).	1	5	CDFG, NMFS HCD, NMFS OLE, SWRCB						TBD	
ScC-A-3.1.2	Recovery Action	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.										
ScC-A-3.1.2.1	Action Step	Hydrology	Promote off-channel storage to reduce impacts of water diversion (e.g. storage tanks for rural residential users).	1	20	California Coastal Conservancy, CalPoly, CDFG, Farm Bureau, Monterey Bay Salmon and Trout Project, NMFS, NRCS, Santa Cruz RCD, Scotts Creek Watershed Council, SWRCB, Trout Unlimited, USFWS						TBD	Costs will vary depending on land owner participation and potential solutions.

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs ($K)						Comments
							FY1	FY2	FY3	FY4	FY5	Entire Duration	
ScC-A-3.1.2.2	Action Step	Hydrology	Promote passive diversion devices designed to allow diversion of water only when minimum streamflow requirements are met or exceeded (DFG 2004).	2	60	California Coastal Conservancy, CalPoly, CDFG, NMFS HCD, Scotts Creek Watershed Council, SWRCB, USACE						TBD	Cost is expected to be minimal
ScC-A-3.1.2.3	Action Step	Hydrology	Evaluate requests for on-stream dams above coho migratory reaches for effects on the natural hydrograph and the supply of spawning gravel for recruitment downstream (DFG 2004).	3	60	California Coastal Conservancy, CDFG, NMFS, NRCS, Private Consultants, Private Landowners, RWQCB, Santa Cruz RCD, SWRCB, USACE, USEPA, USFWS						0	
ScC-A-3.1.3	Recovery Action	Hydrology	Improve compliance with existing water resource regulations via monitoring and enforcement.										
ScC-A-3.1.3.1	Action Step	Hydrology	Identify and eliminate depletion of summer base flows from unauthorized water uses.	1	3	CDFG Law Enforcement, NMFS OLE, Private Landowners, Public, RWQCB, SWRCB	33.33	33.33	33.33			100	Estimate is for regulatory agency staff time to investigate potential illegal diversions.
ScC-A-3.1.3.2	Action Step	Hydrology	Improve coordination between agencies and others to address season of diversion, off-stream reservoirs, bypass flows protective of coho salmon and their habitats, and avoidance of adverse impacts caused by water diversion (DFG 2004).	2	60	CDFG, NMFS, NRCS, RWQCB, Santa Cruz County, SWRCB, USACE, USEPA, USFWS						TBD	Costs cannot be determined at this time.
ScC-A-3.1.3.3	Action Step	Hydrology	Encourage compliance with the most recent update of NMFS' Water Diversion Guidelines.	1	60	CalFire, CalPoly, CDFG, Farm Bureau, NRCS, Private Landowners, Santa Cruz County, SWRCB, USACE						TBD	Costs should be minimal if this concept is adopted early in the planning process for all new development.
ScC-A-3.1.4	Recovery Action	Hydrology	Monitor, identify problems, and prioritize need for changes to water diversion on current or potential coho streams (DFG 2004).										
ScC-A-3.1.4.1	Action Step	Hydrology	Establish a comprehensive stream flow evaluation program to determine instream flow needs for coho salmon.	1	3	California Coastal Conservancy, CalPoly, CDFG, NMFS HCD, Private Consultants, Scotts Creek Watershed Council	20.00	20.00	20.00			60	This should happen concurrently with the water availability analysis study. This cost estimate is for the coho salmon flow portion of the study.
ScC-A-3.1.4.2	Action Step	Hydrology	Support SWRCB in regulating the use of streamside wells and groundwater.	2	60	CDFG, NMFS, Public, RWQCB, SWRCB, USEPA, USFWS						0	Costs should be minimal if incorporated into updated general plan.
ScC-A-3.1.4.3	Action Step	Hydrology	Request that SWRCB review and/or modify water use based on the needs of coho salmon and authorized diverters (DFG 2004).	2	60	CDFG, NMFS, RWQCB, Santa Cruz County, USACE, USEPA, USFWS						TBD	
ScC-A-3.1.5	Recovery Action	Hydrology	Provide incentives to water rights holders willing to convert some or all of their water right to instream use via petition change of use and §1707 (DFG 2004).										
ScC-A-3.1.5.1	Action Step	Hydrology	Encourage CalFire to modify water right for diversion in upper headwaters of Scott Creek.	3	5	CalFire, CDFG, NMFS, SWRCB	4.00	4.00	4.00	4.00	4.00	20	

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs ($K)						Comments
							FY1	FY2	FY3	FY4	FY5	Entire Duration	
ScC-A-3.1.5.2	Action Step	Hydrology	Encourage Lockheed to remove dam on Mill Creek and cease water diversions in Mill Creek.	3	5	CDFG, NMFS, SWRCB						TBD	Cost will depend on landowner willingness to participate in coho recovery.
ScC-A-3.1.5.3	Action Step	Hydrology	Evaluate dam and impacts of water diversion in Boyer Creek (tributary to Big Creek).	3	5	CDFG, NMFS, Scotts Creek Watershed Council, SWRCB						TBD	Costs for evaluation are not expected to be significant, however dam modification may be expensive.
ScC-A-6.1	Objective	Pool Habitat	Improve summer rearing, winter rearing, and smolt survival by increasing instream channel complexity in potential rearing and migration reaches. Additionally, improve egg survival by reducing redd scour in streams characterized by high bedload mobility.										
ScC-A-6.1.1	Recovery Action	Pool Habitat	Encourage the development and implementation of large woody debris supplementation programs to increase stream complexity and gravel retention, and improve pool frequency and depth (DFG 2004).										
ScC-A-6.1.1.1	Action Step	Pool Habitat	Identify historic CCC coho salmon habitats lacking in channel complexity and initiate restoration projects designed to create or restore complex habitat features that provide for localized pool scour, velocity refuge, and cover.	1	15	Big Creek Lumber Co., CalFire, California Coastal Conservancy, CalPoly, CalTrans, CDFG, FEMA, NOAA RC, NRCS, Private Landowners, Santa Cruz County, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz County Land Trust, Santa Cruz RCD, Scotts Creek Watershed Council, USACE						TBD	
ScC-A-6.1.1.2	Action Step	Pool Habitat	Incorporate large woody debris (preferably large diameter redwood trees) into stream bank protection projects, where appropriate. Do not use aqua logs (cylindrical concrete rip rap).	3	60	City of Santa Cruz, City of Scotts Valley, Santa Cruz County, USACE						TBD	Cost will depend on number of stream bank protection projects in Scott Creek. This number is unknown and will vary depending on water year. Cost of LWD may be less expensive in this watershed due to ongoing timber management actions.
ScC-A-6.1.1.3	Action Step	Pool Habitat	Educate landowners, land managers, and County and municipal staffs on the importance of LWD to coho survival and recovery, and watershed processes.	2	10	Big Creek Lumber Co., CalFire, CalPoly, CDFG, FishNet 4C, Monterey Bay Salmon and Trout Project, NMFS, Private Landowners, Santa Cruz County, Santa Cruz RCD, USFWS	1.00	1.00	1.00	1.00	1.00	10	Costs are anticipated to be lower in Scott Creek than in many of the more urbanized watersheds in the Santa Cruz Mtns Diversity Stratum due to the familiarity of many landowners with salmon and their habitat requirements.

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

Recovery Strategy Number	Level	Targeted Attribute or Threat	Action Description	Priority Number	Action Duration (Years)	Recovery Partners	Costs ($K)						Comments
							FY1	FY2	FY3	FY4	FY5	Entire Duration	
ScC-A-6.1.1.4	Action Step	Pool Habitat	Install properly sized large woody debris to appropriate viability table targets.	1	15	Big Creek Lumber Co., CA Coastal Commission, CalFire, California Department of Mines and Geology, CalPoly, CDFG, NMFS PRD, NOAA RC, NRCS, RWQCB, Santa Cruz County, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD, Scotts Creek Watershed Council, USACE, USFWS	66.67	66.67	66.67	66.67	66.67	1,000	Most LWD structures will need some engineering design and may need to be secured to minimize concerns due to downstream infrastructure. Impacts to watersurface elevations per FEMA concerns may also be required. Due to the large number of roads adjacent to the stream, access costs may be reduced. DFG (2004) estimated costs ranging between 60,000 dollars per stream mile in a small rocky stream to 140,000 per stream mile in large rocky stream. It is unknown how close these LWD estimates are to the viability table targets.
ScC-A-6.1.2	Recovery Action	Pool Habitat	Encourage landowners to implement restoration projects as part of their ongoing operations in stream reaches where large woody debris is lacking.										
ScC-A-6.1.3	Recovery Action	Pool Habitat	Encourage retention and recruitment of large woody debris for all historic CCC coho salmon streams to maintain and enhance current stream complexity, pool frequency, and depth. Consult a hydrologist and qualified fisheries biologist before removing wood from streams.	1	60	CDFG, NMFS, NMFS OLE, Private Landowners						0	
ScC-A-6.1.3.1	Action Step	Pool Habitat	Mitigate LWD removal at a 3:1 ratio. LWD should be of comparable size and length.	2	60	CalFire, CalPoly, CalTrans, CDFG, FEMA, NMFS PRD, NRCS, Santa Cruz County, USFWS						TBD	These practices are commonly implemented as part of ongoing THP practices.
ScC-A-7.1	Objective	Riparian Vegetation	Improve the structure and composition of riparian areas to provide shade, large woody debris input, nutrient input, bank stabilization, and other CCC coho salmon needs.										
ScC-A-7.1.1	Recovery Action	Riparian Vegetation	Promote streamside conservation measures, including conservation easements, setbacks, and riparian buffers (DFG 2004).										
ScC-A-7.1.1.1	Action Step	Riparian Vegetation	Promote the re-vegetation of the native riparian plant community within inset floodplains and riparian corridors to ameliorate instream temperature and provide a source of future large woody debris recruitment.	3	60	Big Creek Lumber Co., CalFire, California Coastal Conservancy, CalPoly, Farm Bureau, FEMA, NRCS, Private Landowners, Santa Cruz County, State Parks						TBD	Initial focus should be directed towards habitats in the lower portion of the Scott Creek watershed.
ScC-A-7.1.2	Recovery Action	Riparian Vegetation	Assess riparian canopy and impacts of exotic vegetation (e.g., Arundo donax, etc.), prioritize and develop riparian habitat reclamation and enhancement programs (DFG 2004).	3	10	CDFG, City of Santa Cruz, NMFS, NOAA RC, Santa Cruz County, Santa Cruz County Parks and Cultural Resources, State Parks	2.00	2.00	2.00	2.00	2.00	20	

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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ScC-A-7.1.2.1	Action Step	Riparian Vegetation	Fully implement the County of Santa Cruz's Integrated Vegetation Management Plan for Roads Near Perennial Waters (URS Corporation, 2008) regarding roadside maintenance activities to discourage or eliminate unwanted vegetation and promote desirable (native) vegetation.	3	60	Big Creek Lumber Co., CalFire, CalPoly, Farm Bureau, FEMA, NRCS, Santa Cruz County Department of Public Works						TBD	
ScC-A-8.1	Objective	Sediment	Improve habitat conditions at multiple life stages by reducing sediment inputs to the stream at the watershed scale.										
ScC-A-8.1.1	Recovery Action	Sediment	Address sediment and runoff sources from road networks and other actions that deliver sediment and runoff to stream channels.										
ScC-A-8.1.1.1	Action Step	Sediment	Locations for sediment catchment basins should be identified, developed and maintained, where appropriate.	2	60	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, Farm Bureau, NRCS, Santa Cruz County Department of Public Works, USACE	0.25	0.25	0.25	0.25	0.25	15	Costs will vary on landowner participation and year to year variation in rainfall patterns. This cost estimate does not include maintenance obligations.
ScC-A-8.1.1.2	Action Step	Sediment	Restoration projects that upgrade or decommission high risk roads in Core areas should be considered an extremely high priority for funding (e.g., PCSRF).	1	60	Big Creek Lumber Co., CalFire, California Coastal Conservancy, CalPoly, CalTrans, CDFG, Farm Bureau, FEMA, NMFS, NRCS, RWQCB, Santa Cruz County Department of Public Works, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD, State Parks, USACE, USEPA, USFWS						TBD	Implementation costs cannot be determined at this time but are likely significant. Costs cannot be determined until appropriate assessments have been conducted. Costs may vary significantly depending on type of road related problems and whether roads are closed or decommissioned.
ScC-A-8.1.2	Recovery Action	Sediment	Work with landowners to assess the effectiveness of erosion control measures throughout the winter period.										
ScC-A-8.1.2.1	Action Step	Sediment	Permitting agencies (State, Federal, and local) should evaluate all authorized erosion control measures during the winter period.	2	60	CalFire, CDFG, FEMA, Mines and Geology, NMFS PRD, NRCS, RWQCB, Santa Cruz County, USACE, USEPA, USFWS						0	This should be considered a standard business practice for all regulatory and oversight agencies.
ScC-A-9.1	Objective	Viability	Develop and implement a monitoring program to evaluate the performance of recovery efforts.										
ScC-A-9.1.1	Recovery Action	Viability	Measure or estimate response of key habitat attributes to recovery efforts across the watershed.										

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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ScC-A-9.1.1.1	Action Step	Viability	Develop standardized watershed assessments within sub-watersheds to define limiting factors specific to those areas. Encourage all major landowners to develop similar assessment methods.	3	5	CalFire, CalPoly, CDFG, NMFS, NRCS, Private Consultants, RWQCB, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD, USFWS						TBD	While standard methods are available outreach will be required to encourage all landowners, funding entities, and researchers to utilize them. Cost for outreach and education are difficult to determine due to an unknown number of participants and problems arising from staff turnover, etc. Costs for a statewide outreach and education program were estimate at 60,000 dollars (DFG 2004). Costs for a watershed specific program would likely be a fraction of that. A lower priority in Scott than some other watersheds due to the number of ongoing monitoring projects in the watershed.
ScC-A-9.1.2	Recovery Action	Viability	Continue funding the Scott Creek lifecycle station operated by NOAA's Santa Cruz Science Center.	1	5	CDFG, Monterey Bay Salmon and Trout Project, NOAA SWFSC, Pacific States Marine Fisheries Commission	100	100	100	100	100	500	
ScC-A-9.1.3	Recovery Action	Viability	Monitor population status for response to recovery actions.										
ScC-A-9.1.3.1	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, Private Consultants	10.00	10.00	10.00	10.00	10.00	100	Juvenile monitoring is currently being conducted by J Smith of SJSU and to a lesser degree by the SWFSC.
ScC-A-9.2	Objective	Viability	Continue to operate MBSTP Kingfisher Flat Hatchery as a conservation hatchery, following the guidelines of the DFG and NMFS (DFG 2004).	1		CDFG, Monterey Bay Salmon and Trout Project, NMFS PRD, NOAA SWFSC, Pacific States Marine Fisheries Commission							Continued operation of this facility is essential to the immediate conservation and genetic viability of coho in the southern watersheds. It is anticipated that the hatchery will need to operate for more than 10 years.
ScC-A-9.2.1	Recovery Action	Viability	Expand the Kingfisher Flat Hatchery as appropriate.	2	10	Big Creek Lumber Co., CDFG, Monterey Bay Salmon and Trout Project, NMFS PRD, NOAA SWFSC, Pacific States Marine Fisheries Commission, Santa Cruz County Fish and Wildlife Advisory Board	80.00	80.00	80.00	80.00	80.00	800	Expansion should only occur (1) if water supply reliability, in quantity and quality, can be ensured. This estimate includes improving rearing ponds into a series of individual raceways and (2) if feedback from monitoring validates assumptions regarding the efficacy of the broodstock program
ScC-A-9.2.2	Recovery Action	Viability	Work with MBSTP to find secure sources for long term funding of the facility.										
ScC-A-9.2.2.1	Action Step	Viability	Obtain funding to initiate a full time monitoring program in order to evaluate the success of the propagation efforts.	1	10	CDFG, Monterey Bay Salmon and Trout Project, NMFS, Public, Santa Cruz County	70.00	70.00	70.00	70.00	70.00	700	Current monitoring of the success of this project is inadequate. Additional monitoring is essential in order to allow adaptive modifications to maximize the benefits from this facility and make adjustments, as necessary.

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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							FY1	FY2	FY3	FY4	FY5	Entire Duration	
ScC-A-9.2.2.2	Action Step	Viability	Obtain funding to ensure long term operation of this facility for the purpose of coho salmon propagation.	1	10	CDFG, Monterey Bay Salmon and Trout Project, NMFS, NOAA RC, NOAA SWFSC, Santa Cruz County Fish and Wildlife Advisory Board	150	150	150	150	150	1,500	Currently funding sources to operate this facility are not secure, much of the current funding comes from donations which have decreased in recent years due to decreased angling opportunities. Due to the importance of this facility for the coho population south of San Francisco Bay, it is very important that adequate funds are secured to ensure the long term viability of this operation. This facility is currently considered essential to preventing the extirpation of CCC coho salmon in the Santa Cruz Mountains Diversity Stratum.
ScC-A-10.1	Objective	Water Quality	Improve summer rearing survival by reducing instream temperatures in potential rearing reaches. See also strategies for restoring and enhancing riparian vegetation.										
ScC-A-10.1.1	Recovery Action	Water Quality	Implement actions to maintain and restore water temperatures to meet habitat requirements for CCC coho salmon in specific streams (DFG 2004).										
ScC-A-10.1.1.1	Action Step	Water Quality	Encourage County of Santa Cruz to establish wider riparian buffers in residential and urban areas.	2	60	CDFG, NMFS, Public, RWQCB						TBD	Not building flood control projects will not incur expenses.
ScC-A-10.1.1.2	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.	2	60	CalFire, California Coastal Conservancy, CalPoly, CDFG, Farm Bureau, FEMA, FishNet 4C, Mines and Geology, NRCS, RWQCB, Santa Cruz County Department of Public Works, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD, Scotts Creek Watershed Council, State Parks, USACE, USEPA, USFWS						TBD	This is a long term action that will require continued emphasis to ensure buy-in from the public and local landowners to ensure long term improvements in water quality. Leveraging existing documents and programs could significantly reduce costs.
ScC-A-11.1	Objective	Agricultural Practices	Improve education and awareness of agencies, landowners and the public regarding salmonid protection and habitat requirements.										
ScC-A-11.1.1	Recovery Action	Agricultural Practices	Work with the agricultural community and Scott Creek Watershed Council to educate landowners and enhance practices that provide for functional watershed processes.	3	60	Big Creek Lumber Co., CalFire, CalPoly, CDFG, Farm Bureau, FishNet 4C, NOAA RC, RWQCB, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD						TBD	Costs should be minimal.
ScC-A-11.2	Objective	Agricultural Practices	Encourage landowners to implement restoration projects as part of their ongoing practices in priority stream reaches and where habitat is in poor or fair condition.										

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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							FY1	FY2	FY3	FY4	FY5	Entire Duration	
ScC-A-11.2.1	Recovery Action	Agricultural Practices	Implement Best Management Practices such as those in the Fish Friendly Farming program (Laurel Marcus and Associates, 2004) used by Sotoyome Resource Conservation District within Sonoma and Mendocino counties (DFG 2004), across all counties where agriculture is a land use. Best management practices should include implementation of buffers and water conservation.	2	5	CalPoly, CDFG, Farm Bureau, FishNet 4C, NMFS HCD, NRCS, Private Consultants, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD	20.00	20.00	20.00	20.00	20.00	100	Most of the cost will likely consist of funding for workshops. Costs may be significantly reduced if existing programs and protocols are used. It is important to note that these practices are not commensurate with the levels of protection necessary to avoid unauthorized take of listed salmonids. They do however, provide a starting point by which a landowner can evaluate the impacts of their land management actions.
ScC-A-11.2.2	Recovery Action	Agricultural Practices	Implement the NRCS/RCD coordinated program for fishery restoration practices.	3	7	California Coastal Conservancy, Farm Bureau, NMFS PRD, NRCS, Santa Cruz RCD						0	
ScC-A-11.2.3	Recovery Action	Agricultural Practices	Institutionalize programs to purchase land/conservation easements to encourage the re-establishment and/or enhancement of natural riparian communities.										
ScC-A-11.2.3.1	Action Step	Agricultural Practices	With willing landowners, protect riparian vegetation buffer zones through conservation planning, acquisition, and easements (DFG 2004). Focus initial efforts on landowners that currently have grazing or agricultural operations along the estuary.	3	60	Big Creek Lumber Co., CalPoly, Conservation Fund, Santa Cruz County Land Trust, The Nature Conservancy						TBD	Cost will vary depend on market conditions, land owner participation, and available funding.
ScC-A-11.3	Objective	Agricultural Practices	Promote agricultural practices that protect and restore habitats for CCC coho salmon.										
ScC-A-11.3.1	Recovery Action	Agricultural Practices	Address sediment and runoff sources from road networks and other actions that deliver sediment and runoff to stream channels.										
ScC-A-11.3.1.1	Action Step	Agricultural Practices	Maintain intact and properly functioning riparian buffers to filter and prevent fine sediment input from entering streams.	1	60	CalPoly, Farm Bureau, NRCS, Private Landowners, RWQCB, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD						0	Roadside berms are common on many private and county roads in Santa Cruz County.
ScC-A-11.3.1.2	Action Step	Agricultural Practices	Develop grazing management plans to increase vegetation on pasture lands by practicing rotational grazing and removing exotics that do not provide forage.	3	60	CalPoly, Farm Bureau, NRCS, Private Landowners						TBD	Cost will vary depending on site conditions and availability of forage and access.
ScC-A-11.3.1.3	Action Step	Agricultural Practices	Promote dry-land farming instead of irrigated crops to reduce impacts of water diversions.	3	60	CalPoly, Farm Bureau						TBD	
ScC-A-11.3.1.4	Action Step	Agricultural Practices	Continue the use of cover crops in agriculture fields.	2	60	CalPoly, Farm Bureau, NRCS, RWQCB, Santa Cruz RCD						0	This should be considered a standard business practice.
ScC-A-11.4	Objective	Agricultural Practices	Reclaim current agricultural land that poses a high risk to salmonid habitat, or has a high recovery benefit to key lifestages, back to a natural landscape.										
ScC-A-11.4.1	Recovery Action	Agricultural Practices	Enhance and restore estuary function by improving complex habitat features.	3	60	Big Creek Lumber Co., California Coastal Conservancy, CalPoly, CalTrans, Farm Bureau, NRCS, Private Consultants, Santa Cruz RCD, State Parks						TBD	Cost will vary according to landowner participation. Benefits to coho will likely be focused on the smolt life stage whereas this recommendation will provide year round benefits to federally threatened CCC steelhead.

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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ScC-A-12.1	Objective	Channel Modification	Restore or minimize impacts to watershed processes (e.g., riparian, sediment transport, hydrology and estuary function).										
ScC-A-12.1.1	Recovery Action	Channel Modification	Thoroughly investigate the ultimate cause of channel instability prior to engaging in site specific channel modifications and maintenance. Identify and target remediation of watershed process disruption as an overall priority.										
ScC-A-12.1.1.1	Action Step	Channel Modification	Evaluate whether proposed stabilization projects will lead to additional instability either up- or downstream.	2	60	California Coastal Conservancy, California Department of Mines and Geology, CalTrans, CDFG, FEMA, NMFS, NRCS, RWQCB, Santa Cruz County, Santa Cruz County Department of Public Works, Santa Cruz RCD, USACE, USEPA, USFWS						0	This recommendation should be adopted as a standard business practice for all agencies and consulting firms involved in actions to address channel and bank stability.
ScC-A-12.1.1.2	Action Step	Channel Modification	Eliminate the use of gabion baskets and undersized rock within the bankfull channel.	2	60	CalFire, California Coastal Conservancy, California Department of Mines and Geology, CalTrans, CDFG, FEMA, NMFS PRD, NRCS, RWQCB, Santa Cruz County, Santa Cruz RCD, USACE						0	
ScC-A-12.1.1.3	Action Step	Channel Modification	Promote bio-engineering solutions as appropriate (e.g. where critical infrastructure is located) for bank hardening projects.	2	60	California Coastal Conservancy, CalTrans, CDFG, Farm Bureau, FEMA, FishNet 4C, NMFS, NRCS, RWQCB, Santa Cruz County, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD, USACE						0	
ScC-A-12.1.1.4	Action Step	Channel Modification	For riparian roads, promote road relocation as a preferred alternative to bank stabilization.	2	60	CalFire, California Coastal Conservancy, California Department of Mines and Geology, CalPoly, CDFG, FEMA, NMFS, NRCS, RWQCB, Santa Cruz County, Santa Cruz RCD, USACE						TBD	Riparian roads constrain channel function in many areas of Scott Creek. Moving roads where feasible may result in significant long term ecological and financial benefits to the riparian areas in the watershed. Particular emphasis should be placed on unpaved private or semi private roads that have relatively little traffic. Ultimate cost will depend on landowner participation and site specific constraints. Abandoned road segments should be properly decommissioned.

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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ScC-A-12.1.2	Recovery Action	Channel Modification	Modify Federal, State, 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, in all historic CCC coho salmon watersheds.	3	30							TBD	Costs are variable. Some costs will be absorbed in more urbanized setting by SWMP requirements from the RWQCB.
ScC-A-15.1	Objective	Droughts	Work with land owners or public agencies to acquire water that would be utilized to minimize effects of droughts.										
ScC-A-15.1.1	Recovery Action	Droughts	Pursue opportunities to acquire or lease water, or acquire water rights from willing sellers, for coho salmon recovery purposes. Develop incentives for water right holders to dedicate instream flows for the protection of coho salmon (DFG 2004)(Water Code § 1707).	2	60	California Coastal Conservancy, CalPoly, NMFS, NRCS, Private Landowners, RWQCB, Santa Cruz County Fish and Wildlife Advisory Board, SWRCB, Trout Unlimited						TBD	The price at which water is sold on environmental markets is determined by negotiations between landowners and purchasing entity. In circumstances where potential agricultural sellers of water rights do not shift to groundwater pumping or make other arrangements such that lands are not left fallow, potential sellers may forgo the agricultural profits they would have gained from irrigating. Cost will vary depending on water availability and landowner participation. It is unknown if this program will gain widespread acceptance in the watershed and therefore costs cannot be estimated. However, it is recommended that the equations used in the State Coho Plan for socioeconomic costs be utilized when more information regarding landowner participation is gathered.
ScC-A-15.2	Objective	Droughts	Minimize water use and seek alternatives during droughts.										
ScC-A-15.2.1	Recovery Action	Droughts	DFG, SWRCB, RWQCB, CalFire, and other agencies and landowners, in cooperation with NMFS, should evaluate the rate and volume of water drafting for dust control in streams or tributaries and where appropriate, minimize water withdrawals that could impact coho salmon. These agencies should consider existing regulations or other mechanisms when evaluating alternatives to water as a dust palliative (including EPA-certified compounds) that are consistent with maintaining or improving water quality (DFG 2004).	3	10	Big Creek Lumber Co., CalPoly, CDFG, NMFS, RWQCB, SWRCB	5.00	5.00	5.00	5.00	5.00	50	
ScC-A-15.2.2	Recovery Action	Droughts	Establish minimum summer releases from the Mill Creek reservoir to ensure rearing habitat is maintained in Mill Creek.	1	3	CDFG, Lockheed, NMFS, SWRCB	8.33	8.33	8.33			25	Regulatory agency staff time. This important coho salmon rearing stream dried down to isolated pools during the drought years of 1988, 2007, and 2008. A contingency plan should also be developed to provide a pulse release from the reservoir in drought years to facilitate adult entry (for broodstock capture for the hatchery) as well as for wild spawning.
ScC-A-15.3	Objective	Droughts	All local and state planning and development should consider, and provide contingencies for, droughts in a manner compatible with CCC coho salmon recovery needs.										
ScC-A-15.3.1	Recovery Action	Droughts	Identify and work with water users to minimize depletion of summer base flows from unauthorized water uses.	2	20	Big Creek Lumber Co., CalPoly, Lockheed, Private Landowners, San Lorenzo Valley Water Agency, SWRCB	1.00	1.00	1.00	1.00	1.00	20	Outreach to landowners already occurs from many of the municipalities and water districts in the watershed.
ScC-A-15.3.1.1	Action Step	Droughts	Encourage SWRCB to bring illegal water diverters and out-of-compliance diverters into compliance with State law.	1	5	CDFG, CDFG Law Enforcement, NMFS HCD, NMFS OLE, NMFS PRD, Private Landowners, Public, SWRCB						0	

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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ScC-A-15.3.2	Recovery Action	Droughts	Implement water conservation strategies that provide for drought contingencies without relying on interception of surface flows or groundwater depletion.										
ScC-A-15.3.2.1	Action Step	Droughts	Critical flow values should include minimum bypass flow requirements to support upstream adult migration during winter months and juvenile rearing in the summer and fall months.	2	5	CDFG, NMFS, Private Consultants						0	A recommendation for critical flow studies is outlined under Hydrology. Therefore no costs are estimated here.
ScC-A-15.3.2.2	Action Step	Droughts	If predicted flows are below a level considered critical to maintain habitat conditions for coho salmon, measures to reduce water consumption should be initiated by users in the watershed through conservation programs.	1	60	Big Creek Lumber Co., CalFire, CalPoly, CDFG, Farm Bureau, NMFS, NRCS, Private Landowners, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD, SWRCB, Trout Unlimited						TBD	
ScC-A-15.3.3	Recovery Action	Droughts	Evaluate and prepare contingency plans to breach estuary sandbars to facilitate adult upmigration when instream flows are adequate for passage and spawning if sandbar remains closed by mid-January and hatchery remains in operation.	1	60	CA Coastal Commission, CDFG, Monterey Bay Salmon and Trout Project, NMFS, NOAA SWFSC, RWQCB, State Parks, USACE, USFWS	0.17	0.17	0.17	0.17	0.17	10	This option is likely most viable in Scott Creek due to the Hatchery and the importance of obtaining CCC coho for the current Broodstock program. This recommendation must be viewed with extreme caution in other watersheds. This recommendation should only be implemented in close cooperation with the NOAA SWFSC, MBSTP, DFG, USACE, State Parks, and other relevant entities. Permitting issues should be worked out well in advance by the regulatory agencies.
ScC-A-15.3.4	Recovery Action	Droughts	Increase oversight on water diversions.	2	60	CDFG Law Enforcement, NMFS OLE, RWQCB, Santa Cruz County, SWRCB, USFWS						TBD	Cost may vary significantly. In more urbanized areas costs will likely be absorbed into SWMP requirements per the RWQCB. Costs in rural areas where these storm water plans are not required may be significant on a project by project basis.
ScC-A-15.3.4.1	Action Step	Droughts	Increase enforcement patrols by DFG and NMFS OLE in sensitive spawning and rearing areas.	2	60	CDFG Law Enforcement, NMFS OLE						0	Costs are expected to be absorbed into ongoing activities.
ScC-A-15.3.4.2	Action Step	Droughts	Work with DFG, County of Santa Cruz, Scott Creek Watershed Council, and knowledgeable biologists (e.g. DFG, NOAA Santa Cruz Science Center, private consultants, CalPoly, etc.) to develop emergency rules and adopt implementation agreements.	2	3	Big Creek Lumber Co., CalFire, CalPoly, CDFG, CDFG Law Enforcement, Farm Bureau, NMFS, Santa Cruz County, Scotts Creek Watershed Council, SWRCB	16.67	16.67	16.67			50	Emergency rules should initially focus on Mill Creek.
ScC-A-16.1	Objective	Fire and Fuels Management	Develop measures protective of salmonids during fire suppression activities.										
ScC-A-16.1.1	Recovery Action	Fire and Fuels Management	Establish fire contingency plan developed by experts from CalFire, local fire districts, Santa Cruz RCD, and regulatory agencies with expertise in fisheries issues.										
ScC-A-16.1.1.1	Action Step	Fire and Fuels Management	Encourage CalFire to provide plan to all non-County fire fighters when providing fire fighting assistance in the Scott Creek watershed (and all other watersheds in the County).	1	5	CalFire						0	Cost of providing the plan is minimal.
ScC-A-16.1.1.2	Action Step	Fire and Fuels Management	In the event of a wildfire, we recommend CalFire Resource Advisors contact the resource agencies for ESA consultation (or technical assistance) about the incident. The resource agencies can provide guidance regarding critical resources in the area that may be affected by fire fighting actions.	2	0	CalFire, CDFG, NMFS, USFWS						TBD	Guidance could include informing CalFire of sensitive biological resources in the watershed as well as recommendations regarding watersource locations (e.g., picking up water from areas other than lagoons when using helicopters).

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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ScC-A-16.1.1.3	Action Step	Fire and Fuels Management	Implement sedimentation reduction techniques in concert with prescribed fire techniques to minimize sediment impacts to various coho salmon life stages.	1	60	CalFire						0	This recommendation should be considered a standard practice.
ScC-A-16.1.1.4	Action Step	Fire and Fuels Management	Immediately implement appropriate sediment control measures following completion of fire suppression while fire fighters and fire fighting equipment are on site.	1	60	Big Creek Lumber Co., Bodega Land Trust						0	This recommendation will result in a net cost savings.
ScC-A-16.1.1.5	Action Step	Fire and Fuels Management	Reduce erosion from fire lines.	1	60	CalFire						0	Implementing erosion control measures when constructing firebreaks (if possible) or shortly thereafter will likely result in a net cost savings. It is much more financially efficient to implement these measures while the fire crews are present rather than months later after the fire is out. Methods should include out-sloping, waterbars, breaks in fire lines (pick up blades on dozers occasionally, especially where fuels are sparse), minimize gradient of fire lines, change fire-line alignment onto occasional flats as often as possible (and especially near watercourses) to allow flows to dissipate and settle sediment. To the maximum extent possible, don't change the ground's topography -- keep water where it naturally flows, not concentrated.
ScC-A-16.1.1.6	Action Step	Fire and Fuels Management	Re-contour any new facility sites as soon as possible after site clean up and fire.	3	60	CalFire						0	Standard business practice.
ScC-A-16.1.2	Recovery Action	Fire and Fuels Management	Disseminate NMFS' October 9, 2007, jeopardy biological opinion on the use of fire retardants to local fire fighting agencies and CalFire.										
ScC-A-16.1.2.1	Action Step	Fire and Fuels Management	Avoid use of aerial fire retardants and foams within 300 feet of riparian areas throughout the current range of CCC coho salmon.	2	60	CalFire						0	This recommendation only applies to situations where people and structures are not immediately threatened by wildfire.
ScC-A-16.1.2.2	Action Step	Fire and Fuels Management	Develop guidance that directs CalFire and other agencies and organizations using fire retardants to conduct an assessment of site conditions following wildfire where fire retardants have entered waterways, to evaluate the changes to on site water quality and the structure of the biological community.	2	60	CalFire, CDFG, NMFS, USFWS						0	Costs are developed for the Aptos watershed and the guidance could be applied elsewhere.
ScC-A-16.1.2.3	Action Step	Fire and Fuels Management	Use non-toxic retardants. Avoid dropping fire retardant into streams. To the maximum extent feasible, orient air drops so that the drop goes perpendicular to streams as opposed to parallel.	2	60	CalFire						TBD	
ScC-A-16.2	Objective	Fire and Fuels Management	Identify historical fire frequency, intensities and durations and manage fuel loads in a manner consistent with historical parameters.										
ScC-A-16.2.1	Recovery Action	Fire and Fuels Management	Conduct fuel load monitoring and compare the results to estimated historical fuel loads.										
ScC-A-16.2.1.1	Action Step	Fire and Fuels Management	Use managed fire to promote revegetation of species that filter out fine sediment.	3	60	CalFire						TBD	
ScC-A-16.2.1.2	Action Step	Fire and Fuels Management	Review prescribed fire plans to ensure they provide adequate protection for riparian corridors.	2	5	CalFire, CDFG, NMFS, NRCS, Santa Cruz County, USFWS						0	Costs are developed for the Aptos watershed. The fire plan could be used in the Scott watershed.
ScC-A-16.2.1.3	Action Step	Fire and Fuels Management	Reassess fire risk every ten years.	3	60	Big Creek Lumber Co., CalFire, CalPoly, Santa Cruz County						TBD	
ScC-A-16.2.1.4	Action Step	Fire and Fuels Management	Work with County planners to define future impacts of proposed urban and infrastructure development on fire suppression and fuel load buildup.	2	5	CalFire, Santa Cruz County	2.00	2.00	2.00	2.00	2.00	10	
ScC-A-17.1	Objective	Fishing and Collecting	Minimize bycatch of CCC coho salmon from offshore commercial and sport fishing.										

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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							FY1	FY2	FY3	FY4	FY5	Entire Duration	
ScC-CCC-17.1.1	Recovery Action	Fishing and Collecting	Conduct outreach and education to anglers to reduce hook-and-release injury and mortality, and on methods to reduce salmonid gut hooking.	3	5	CDFG, NMFS, Pacific States Marine Fisheries Commission	4.00	4.00	4.00	4.00	4.00	20	Costs may vary significantly depending on number of new projects constructed and standards typically implemented. Cost cannot be determined at this time.
ScC-CCC-17.1.1.1	Action Step	Fishing and Collecting	Work with DFG to improve the Fishing Regulation manual to clearly identify differences in body morphology of all potentially present adult salmonids with color photos of diagnostic features (e.g., caudal fin spotting, caudal fin shape, coloration of lower jaw, peduncle width, etc.).	2	5	CDFG, NMFS	1.00	1.00	1.00	1.00	1.00	5	
ScC-CCC-17.1.1.2	Action Step	Fishing and Collecting	Work with DFG to monitor the Scott Creek sandbar until river flows naturally breach the sandbar.	2	60							0	Costs should be covered already as part of ongoing monitoring efforts.
ScC-CCC-17.2	Objective	Fishing and Collecting	Minimize interception of CCC coho salmon during the trout and steelhead freshwater sport fishing season.										
ScC-CCC-17.2.1	Recovery Action	Fishing and Collecting	Promote CalTip to discourage poaching (DFG 2004).	2	60	CDFG, NMFS, NMFS OLE, Public						0	
ScC-CCC-17.2.2	Recovery Action	Fishing and Collecting	Work with landowners to conduct actions (e.g., maintain road and trail closures) that prevent trespass and poaching.	2	20	Big Creek Lumber Co., CalFire, CalPoly, CDFG, NMFS, Private Landowners, Public, Santa Cruz County Fish and Wildlife Advisory Board, Santa Cruz RCD, Scotts Creek Watershed Council	0.50	0.50	0.50	0.50	0.50	10	Cost is expected to be minimal and already largely covered as part of an existing outreach program to landowners and concerned citizen in the Scott Creek watershed.
ScC-CCC-20.1	Objective	Logging and Wood Harvesting	Devise incentive programs and incentive-based approaches to encourage and support landowners who conduct operations in a manner compatible with CCC coho salmon recovery priorities.										
ScC-CCC-20.1.1	Recovery Action	Logging and Wood Harvesting	Encourage a watershed-wide HCP for all or multiple landowners within a watershed to pool resources as a means to facilitate long-term survival and recovery for coho salmon and their habitat.	2	30	Big Creek Lumber Co., CalPoly, CDFG, NMFS, Private Landowners, Santa Cruz County, State Parks, USFWS	20.00	20.00	20.00	20.00	20.00	600	If existing information is adequate regarding watershed conditions for covered species, it is possible to reduce overall costs considerably. However, if HCP negotiations are contentious and protracted, costs could increase considerably.
ScC-CCC-20.2	Objective	Logging and Wood Harvesting	Maintain and expand California's working forestlands and forestlands held by the State, and prevent future conversion of forestlands to agriculture or other land uses.										
ScC-CCC-20.2.1	Recovery Action	Logging and Wood Harvesting	Coordinate with the agencies that authorize conversions to minimize conversions in key watersheds and discourage forestland conversions.										
ScC-CCC-20.2.1.1	Action Step	Logging and Wood Harvesting	Discourage Santa Cruz County from rezoning forestlands to rural residential or other land uses (e.g., vineyards).	1	60	Board of Forestry, CalFire, Santa Cruz County, Santa Cruz County Land Trust						0	Costs should be minimal if Santa Cruz County readily adopts this recommendation.
ScC-CCC-20.2.1.2	Action Step	Logging and Wood Harvesting	Discourage home building or other incompatible land use in areas identified as timber production zones (TPZ).	1	60	Board of Forestry, CalFire, CDFG, Public, Santa Cruz County, Santa Cruz County Land Trust						0	
ScC-CCC-20.3	Objective	Logging and Wood Harvesting	Provide for properly functioning watershed processes (e.g., cycles of wood, water and sediment) by promoting long term sustainable forestry practices that support coho salmon habitats.										
ScC-CCC-20.3.1	Recovery Action	Logging and Wood Harvesting	Address sediment and runoff sources from road networks and other actions that deliver sediment and runoff to stream channels.										

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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ScC-A-20.3.1.1	Action Step	Logging and Wood Harvesting	Extend the monitoring period and upgrade THP road maintenance after harvest.	3	5	Big Creek Lumber Co., CalFire, CalPoly, CDFG, Private Landowners, RPFs						TBD	Financial impact will depend on rate of harvest in the watershed. Overall costs should be minimal.
ScC-A-20.3.1.2	Action Step	Logging and Wood Harvesting	New THPs should identify problematic legacy roads within WLPZ's, decommission them, and revegetate the area with appropriate native species.	2	60	Big Creek Lumber Co., CalFire, CalPoly, CDFG, RWQCB						TBD	Most of these costs will likely be associated with planned ongoing harvest.
ScC-A-20.3.1.3	Action Step	Logging and Wood Harvesting	Map unstable soils and use that information to guide land use decisions, road design, THPs, and other activities that can promote erosion.	2	60	CalFire, California Department of Mines and Geology, CDFG, RWQCB, Santa Cruz County						TBD	This cost is expected to be minimal because these areas should be identified prior to permitting by appropriate regulatory agencies. These data should be held in a central repository by either the County of Santa Cruz and or CalFire.
ScC-A-20.3.1.4	Action Step	Logging and Wood Harvesting	Encourage tree retention on the axis of headwall swales. Any deviations should be reviewed and receive written approval by a licensed engineering geologist.	2	60	CalFire, California Department of Mines and Geology, Private Landowners, RPFs, RWQCB						0	Cost is expected to be minimal.
ScC-A-20.3.2	Recovery Action	Logging and Wood Harvesting	Conduct conifer release to promote growth of larger diameter trees where appropriate.	3	60	Big Creek Lumber Co., CalFire, CalPoly, Private Landowners, RPFs, RWQCB						0	Conifer release in Scott Creek should only occur in stream reaches where instream temperatures have been previously demonstrated as suitable for coho salmon. Cost should be minimal as it is anticipated this recommendation will only be implemented as part of an approved timber harvest plan.
ScC-A-20.3.3	Recovery Action	Logging and Wood Harvesting	Conserve and manage forestlands for older forest stages.	3	60	Big Creek Lumber Co., CalFire, CalPoly, CDFG, Private Landowners, RWQCB, Santa Cruz County						0	Some costs may be incurred by landowner depending on management philosophy.
ScC-A-24.1	Objective	Roads and Railroads	Conduct outreach and education regarding the adverse effects of roads, and the types of best management practices protective of salmonids.										
ScC-A-24.1.1	Recovery Action	Roads and Railroads	Continue education of Caltrans, County road engineers, and County maintenance staff regarding watershed processes and the adverse effects of improper road construction and maintenance on salmonids and their habitats.	2	60	CalFire, CalTrans, Private Consultants, Private Landowners, RWQCB, Santa Cruz County, Santa Cruz County Department of Public Works, Santa Cruz RCD	0.17	0.17	0.17	0.17	0.17	10	Ongoing programs, such as FishNet 4C, could facilitate this recommendation.
ScC-A-24.1.2	Recovery Action	Roads and Railroads	Educate county policy staff and Board of Supervisors on the benefits of railcar bridges and provide information from other counties where they are commonly used.	3	60	CDFG, NMFS, Santa Cruz County						0	
ScC-A-24.2	Objective	Roads and 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.										
ScC-A-24.2.1	Recovery Action	Roads and Railroads	Decommission riparian road systems and/or upgrade roads (and skid trails on forestlands) that deliver sediment into adjacent watercourses (DFG 2004).	1	60	Big Creek Lumber Co., CalFire, CalPoly, Mines and Geology, Private Landowners, RWQCB, Santa Cruz RCD	16.67	16.67	16.67	16.67	16.67	1,000	Costs may vary widely depending on number of riparian roads and the magnitude of the problem associated with the roads.

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ScC-A-24.2.2	Recovery Action	Roads and Railroads	Assess and redesign transportation network to minimize road density and maximize transportation efficiency.	3	60	Big Creek Lumber Co., CalFire, CalPoly, CDFG, Farm Bureau, Santa Cruz County						TBD	This is a long term plan that would require cooperation from the majority of the landowners in the watershed. It is unknown if this is a feasible alternative for Scott Creek. Primary emphasis should be placed on removing riparian roads with high sediment delivery potential adjacent to key spawning and rearing areas.
ScC-A-24.3	Objective	Roads and Railroads	Conduct actions that hydrologically disconnect roads in Core areas within five years (from 2010).										
ScC-A-24.3.1	Recovery Action	Roads and Railroads	Address sediment sources from road networks and other actions that deliver sediment to stream channels.										
ScC-A-24.3.1.1	Action Step	Roads and Railroads	Provide and maintain adequate energy dissipaters for culverts and other drainage pipe outlets where needed.	2	60	Big Creek Lumber Co., CalFire, CalPoly, Farm Bureau, NRCS, RWQCB, Santa Cruz County Department of Public Works, USACE	0.67	0.67	0.67	0.67	0.67	40	A culvert inventory is needed.
ScC-A-24.3.1.2	Action Step	Roads and Railroads	Licensed engineering geologists should review and approve grading on inner gorge slopes.	2	60	Big Creek Lumber Co., CalFire, California Department of Mines and Geology, CalPoly, CDFG, RWQCB						TBD	This is a cost that is frequently absorbed into new road projects and should be considered a standard business practice.
ScC-A-24.3.1.3	Action Step	Roads and Railroads	Evaluate and remove roadside berms that lead to increased runoff velocities and result in increased sediment discharge.	2	20	Big Creek Lumber Co., CalFire, CalPoly, Farm Bureau, NRCS, Private Landowners, RWQCB, Santa Cruz County Department of Public Works, Santa Cruz RCD, USACE	2.50	2.50	2.50	2.50	2.50	50	Roadside berms are a common feature on many private and county roads in Santa Cruz County. Many of the private timberland roads have been upgraded and are hydrologically disconnected. A similar effort should occur on the remaining roads in the watershed. The cost of this effort cannot be estimated until a complete watershed wide inventory in conducted.
ScC-A-24.3.1.4	Action Step	Roads and Railroads	Install sediment traps for pretreatment, and a modified culvert system that can act as an efficient detention system.	3	60	Big Creek Lumber Co., CalFire, CalPoly, CDFG, NRCS, RWQCB, Santa Cruz RCD, USACE						TBD	Cost will vary depending on the number of culvert upgrades on the road network and the maintenance requirements and accessibility. An inventory of the culvert system is necessary before costs can be estimated.
ScC-A-24.3.2	Recovery Action	Roads and Railroads	Limit winter use of unsurfaced roads and recreational trails by unauthorized and impacting uses to decrease fine sediment loads.	2	5	CDFG, NMFS HCD, NMFS OLE, NMFS PRD, Private Consultants, SWRCB	10.00	10.00	10.00	10.00	10.00	50	This recommendation may involve increased intra-watershed coordination among the landowners (locking and installing gates, etc.).
ScC-A-24.3.2.1	Action Step	Roads and Railroads	Conduct annual inspections of all roads prior to winter. Correct conditions that are likely to deliver sediment to streams. Hydrologically disconnect roads.	1	60	Big Creek Lumber Co., CalFire, CalPoly, Private Landowners, Santa Cruz County						TBD	
ScC-A-24.3.3	Recovery Action	Roads and Railroads	Use available best management practices for road construction, maintenance, management and decommissioning (e.g. Hagans & Weaver, 1994; Sommarstrom, 2002; Oregon Department of Transportation, 1999).	1	60	Big Creek Lumber Co., CalFire, California Department of Mines and Geology, CalPoly, NRCS, Private Landowners, RPFs, RWQCB, Santa Cruz County, Santa Cruz RCD						TBD	Cost cannot be determined at this time but should be adopted as part of future road actions and maintenance practices.

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ScC-A-24.3.4	Recovery Action	Roads and Railroads	Bridges associated with new roads or replacement bridges (including railroad bridges) should be free span or constructed with the minimum number of bents feasible in order to minimize drift accumulation and facilitate fish passage.										
ScC-A-24.3.4.1	Action Step	Roads and Railroads	Stream crossings on THP parcels should be identified and mapped with the intention of replacement or removal if they cannot pass 100 year flow. Design should include fail safe measures to accommodate culvert overflow without causing massive road fill failures.	2	60	Big Creek Lumber Co., CalFire, CalPoly, RWQCB, Santa Cruz County, USACE						TBD	
ScC-A-24.3.4.2	Action Step	Roads and Railroads	The proposed bridge replacement for Highway 1 over Scott Creek should be relocated to allow Scott Creek to re-establish its historical outlet into the ocean. Relocating the replacement bridge could facilitate the re-establishment of the historical tidal prism in the lower lagoon.	2	10	CalTrans, CDFG, NMFS						TBD	Costs were not estimated because Caltrans is planning to replace the existing Highway 1 bridge. Increased costs may be associated with the proposed recommendation but this information is currently unavailable.
ScC-A-24.4	Objective	Roads and Railroads	Reduce sediment sources from road networks, maintenance activities, and other actions that deliver sediment to stream channels through improved, or new, laws and policies, and/or enforcement of existing laws and policies.										
ScC-A-24.4.1	Recovery Action	Roads and 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.	2	20	CalFire, CalPoly, CalTrans, CDFG, Private Landowners, Santa Cruz County						TBD	Cost may vary significantly. However, a well designed road management plan should result in overall cost savings due to reduced flood fighting actions, and stream bank and road stabilization projects.
ScC-A-24.4.2	Recovery Action	Roads and 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	10	Santa Cruz County	5.00	5.00	5.00	5.00	5.00	50	Costs are estimated for Scott Creek watershed only. Costs are an estimate of County staff time.
ScC-A-24.4.3	Recovery Action	Roads and Railroads	For all rural (unpaved) and seasonal dirt roads apply (at a minimum) the road standards outlined in the California Forest Practice Rules.	1	5	Farm Bureau, Private Landowners, RWQCB, Santa Cruz County						TBD	
ScC-A-25.1	Objective	Storms and Flooding	Conduct outreach and education regarding how local, city, county, State and Federal planning can put in place mechanisms that provide community resiliency to storms and flooding.										
ScC-A-25.1.1	Recovery Action	Storms and Flooding	Agencies should develop large woody debris retention programs and move away from the practice of removing instream large woody debris under high flow “emergencies”.	1	60	CDFG, NOAA RC, Santa Cruz County, Santa Cruz RCD						0	Santa Cruz County is well under way in the development of this program.
ScC-A-25.1.2	Recovery Action	Storms and Flooding	Design new development to allow streams to meander in historical patterns, Protecting riparian zones and their floodplains or channel migration zones averts the need for bank erosion control in most situations.	1	60	Farm Bureau, FEMA, HUD, NRCS, RWQCB, Santa Cruz County, USACE						TBD	Cost will vary depending on site specific conditions. Avoiding building in channel migration zones can result in long term cost saving due to reduced flood fighting and consequent stabilization measures.
ScC-A-25.1.3	Recovery Action	Storms and Flooding	Land use zoning should be appropriate to the site and be tolerant to anticipated conditions (e.g., tolerant to frequent flooding).										
ScC-A-25.1.3.1	Action Step	Storms and Flooding	Counties and municipalities should adopt a policy of “managed retreat” (removal of problematic infrastructure and replacement with native vegetation or flood tolerant land uses) for areas highly susceptible to, or previously damaged from, flooding.	3	60	FEMA, Private Landowners, Santa Cruz County, USACE						TBD	This could be a costly recommendation depending on the infrastructure and the feasibility of removing it. Some infrastructure may be relatively easy to remove while other infrastructure will be extremely difficult. This recommendation should be viewed as an opportunistic strategy and should be used strategically.

Scott Creek (Santa Cruz Mountains) Threats and Associated Recovery Actions

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ScC-A-25.1.3.2	Action Step	Storms and Flooding	Existing areas with floodplains or off channel habitats should be protected from future urban development of any kind.	1	60	CDFG, FEMA, HUD, NRCS, RWQCB, Santa Cruz County, USACE						0	
ScC-A-25.1.3.3	Action Step	Storms and Flooding	Flood control projects or other modifications facilitating new development (as opposed to protecting existing infrastructure) should be avoided.	1	60	FEMA, NRCS, RWQCB, San Mateo RCD, USACE						0	
ScC-A-25.1.3.4	Action Step	Storms and Flooding	Modify County General Plan to eliminate provisions allowing new construction in undeveloped areas within the 100-year flood prone zones in all historic CCC coho salmon watersheds.	1	5	FEMA, HUD, Santa Cruz County						TBD	
ScC-A-25.1.4	Recovery Action	Storms and Flooding	Develop Bank Stabilization and Floodplain Guidelines for use by private and public entities.	1	5	CDFG, NMFS, NRCS, RWQCB, Santa Cruz County, Scotts Creek Watershed Council, USACE	4.00	4.00	4.00	4.00	4.00	20	Existing documents and policies can be used for this recommendation. Costs would increase if a number of site specific conditions and criteria are developed.
ScC-A-25.1.5	Recovery Action	Storms and Flooding	Patterns of water runoff, including surface and subsurface drainage, should match, to the greatest extent possible, the natural hydrologic pattern for the watershed in timing, quantity, and quality.	1	60	Big Creek Lumber Co., CalFire, CalPoly, CalTrans, FEMA, NRCS, Santa Cruz County, Santa Cruz RCD, USACE						TBD	Costs will vary significantly depending on site specific conditions and landowner willingness to have roads and other infrastructure addressed to improve hydrologic function. As a general recommendation for future development, costs may vary depending on existing infrastructure and site specific conditions.
ScC-A-25.1.6	Recovery Action	Storms and Flooding	Work with local governments to incorporate protection of CCC coho salmon in any flood management activity (DFG 2004).	2	10	CDFG, FEMA, Private Landowners, Santa Cruz County, USACE						0	Outreach and education are ongoing, and additional costs are expected to be minimal.
ScC-A-25.2	Objective	Storms and Flooding	Protect high-risk shallow-seeded landslide areas and surfaces prone to erosion from being mobilized by intense storm events.										
ScC-A-25.2.1	Recovery Action	Storms and Flooding	Establish targeted polices, requirements and assistance for sandy soils areas.	3	60	CalFire, CalTrans, Santa Cruz County						TBD	