CASPAR CREEK

Caspar Creek

Recovery Target: 435 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:

- Logging and Wood Harvesting
- Roads and Railroads

Preventing the extinction of coho salmon

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

- Improve gravel quality by reducing sediment inputs
- Reduce sources of sediment
- Improve pool complexity and increase number of pools
- Increase the frequency of off channel habitat and floodplain connectivity
- Reduce the amount of roads in and near the riparian zone and throughout the watershed

We Need Your Photo Here

Caspar Creek
Photo © Your Name Here, AFFIL

Advancing recovery of coho

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

- Restoration projects that upgrade or decommission high risk roads in Core Area.
- Install or enhance existing woody debris, boulders, and other features to increase stream complexity and improve pool frequency and depth.
- Implement projects that improve habitat complexity.
- Implement the Jackson Demonstration State Forest Road Management Plan.
- Establish a moratorium on new road construction in sensitive areas until a watershed road management plan is created and implemented.
- Identify incentives to restore high priority sites as determined by watershed analysis, DFG, or the Jackson Demonstration State Forest EIR.

. . . **throughout** the Caspar Creek watershed.

Conservation Highlights

- Watershed restoration and research actions by the California State Parks, Mendocino Land Trust, JDSF, and US Forest Service Pacific Southwest Research Station.
- Coho salmon life cycle station operated by DFG.

We Need Your Photo Here

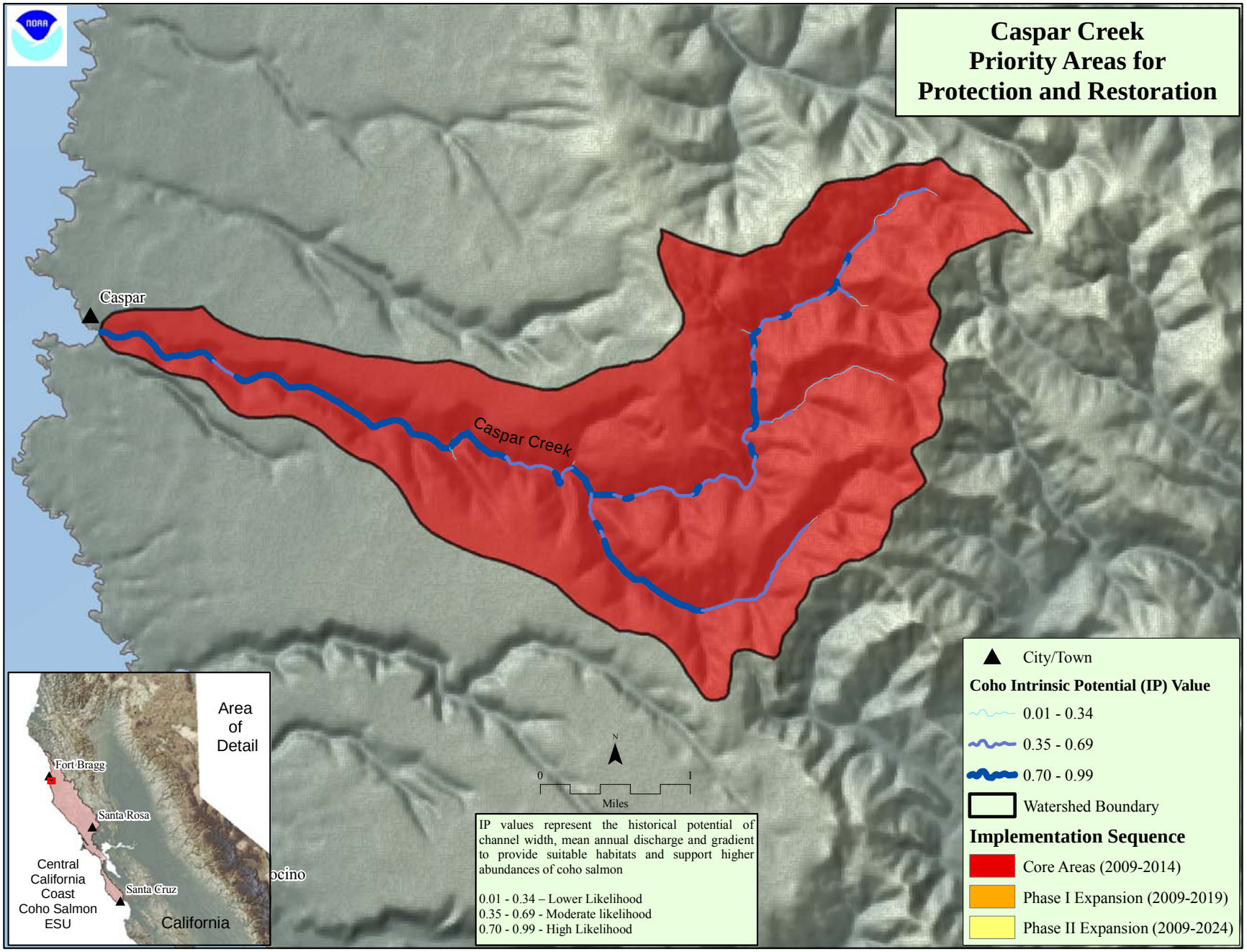
Caspar Creek
Photo © Your Name Here, AFFIL

Immediate Needs

√ Continue collaborative watershed restoration and research actions
√ Implement the JDSF Road Management Plan
√ Continue efforts to place large woody debris structures in streams throughout the watershed
√ Control invasive plant species
√ Protect the Sitka spruce as source of LWD
√ Continue ongoing fish sampling efforts

Recovery Partners:

NMFS
DFG
California State Parks
Mendocino Land Trust
Jackson Demonstration State Forest
USFS Pacific Southwest Research Station


Caspar Creek
Priority Areas for
Protection and Restoration
Caspar
Caspar Creek
Area
of
Detail
Fort Bragg
Santa Rosa
Central
California
Coast
Coho Salmon
ESU
Santa Cruz
California
ocino
N
0
1
Miles
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
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)

CCC Coho Salmon
Caspar Creek
CAP Viability Table Results

Analyst	Source	Result	Rating	Target	Habitat Attribute	Indicator	Poor	Fair	Good	Very Good
Flow Panel	Decision Matrix	33	Very 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	60-90 days	Good	Spawning Adults	Passage	Passage at Mouth	<30 days	30-60 days	60-90 days	>90 days
SEC	CDFG HAB 8	5687 m²	Very Good	Spawning Adults	Sediment	Amount of Gravel*	<100 m²	100-600 m²	600-1300 m²	>1300 m²
NMFS	Best Prof. judgment	<5%	Good	Spawning Adults	Viability	Freshwater Harvest	>10% of pop.	5-10%	<5%	
Flow Panel	Decision Matrix	<35	Very Good	Eggs	Hydrology	Instantaneous Condition	>75 (score)	51-75	35-50	<35
Flow Panel	Decision Matrix	<36	Very Good	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	39%	Poor	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	35-50	Good	Summer Rearing	Hydrology	Baseflow	>75 (score)	51-75	35-50	<35
SEC	CDFG HAB 8	52.3	Poor	Summer Rearing	Pool Habitat	Shelter Rating	<60 avg. rating	60-80	80-100	>100
SEC	CDFG HAB 8	8%	Poor	Summer Rearing	Pool Habitat	Primary Pools	<30% pools by length	30-40%	40-50%	>50%
SEC/NMFS	Many Sources	NA	Good	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	52.3	Fair	Winter Rearing	Floodplain	Complex Habitat**	<50% Connected	50-80% connected	>80% connected	
NMFS	NCWAP	Good	Good	Smolts	Estuary	Estuary				
Flow Panel	Decision Matrix	Very Good	Very Good	Smolts	Hydrology	Passage Flows	>75 (score)	51-75	35-50	<35
SEC	SWRCB	0/10 IP-km	Very Good	Smolts	Passage	# of Diversions**	>5 / 10 IP km	1.1-5	0.01-1	0
SEC	CDFG HAB 8	52.3	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	55%	Good	Multiple Life Stages	Hydrology	Stand Age			>40 years old	
SEC	NLCDB	0.22%	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%	Very Good	Multiple Life Stages	Land disturbance	Agriculture	>30% of WS by area	10-30%	0.1-10%	<0.1%
NMFS	CDF THP Dataset	2%	Very Good	Multiple Life Stages	Land disturbance	Timber Harvest	>35% of WS by area	25 - 35%	10 - 25%	<10%
SEC	Many Sources	13.3/ 100 m	Very Good	Multiple Life Stages	Pool Habitat	LWD Freq. (BFW 0-10)	<4key pcs/100m	4-6/100m	6-11/100m	>11/100m
SEC	Best Prof. judgment	NA	NA	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	25-50%	Fair	Multiple Life Stages	Riparian Veg.	Species Composition	<25%	25-50%	>50%	Historical Conditions
NMFS	CDF CWHR	56%	Good	Multiple Life Stages	Riparian Veg.	DBH	<39% Class 5 and 6	40-54%	55-69%	>69%
SEC	CDFG HAB 8	96%	Good	Multiple Life Stages	Riparian Veg.	Canopy Cover	<75 % avg. over IP-km	75-85%	85-95%	>95%
NMFS	CDF THP Dataset	5.1mi./sq.mi.	Poor	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	5.8me./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	Good	Good	Multiple Life Stages	Water Quality	Toxicity	Acute	Sublethal or Chronic	No Acute or Chronic	No evidence of toxins or Contaminants
NMFS	Best Prof. judgment	1-20 per IP-km	Fair	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/m²	Fair	Summer Rearing	Viability	Juvenile Density	< 0.2 fish/m²	0.2-0.5 fish/m²	0.5-1.0 fish/m²	>1.0 fish/m²
NMFS	Best Prof. judgment	>50%	Very 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

Caspar 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	Roads and Railroads	Medium	High	Medium	Medium	Medium	Very High			High
2	Logging and Wood Harvesting	Medium	High	Medium	Medium	Medium	High			High
3	Recreational Areas and Activities	Medium	Low	Medium	Medium	Medium	Medium			Medium
4	Fire and Fuel Management	Medium	Medium	Medium	Medium	Medium	Medium			Medium
5	Climate Change	Medium	Medium	Medium	Medium	Medium	Low			Medium
6	Droughts	Medium	Medium	Medium	Medium	Medium	Low			Medium
7	Storms and Flooding	Low	Low	Medium	Medium	Medium	Medium			Medium
8	Residential and Commercial Development	Medium	Low	Medium	Medium	Medium				Medium
9	Water Diversion and Impoundment	Medium	Low	Medium	Medium	Medium	-			Medium
10	Channel Modification	Medium	Low	Low	Medium	Low	Low			Medium
11	Agricultural Practices	Low	Low	Low	Medium	Low	-			Low
12	Livestock Farming and Ranching	Low	Low	Low	Medium	Low	-			Low
13	Mining	Low	Low	Low	Medium	Low	-			Low
14	Hatcheries and Aquaculture	Low	-	-	Low	Low	Low			Low
15	Disease, Predation, and Competition	Low	-	Low	-	Low	-			Low
16	Fishing and Collecting	-	-	Low	Low	Low	-			Low
Threat Status for Targets and Project		Medium	High	Medium	High	High	High	-	-	High

Caspar Creek (Lost Coast-Navarro Point) 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	
CaC-A-2.1	Objective	Floodplain	Improve over-winter survival by increasing the frequency and functionality of off-channel habitats.										
CaC-A-2.1.1	Recovery Action	Floodplain	Delineate reaches possessing both potential winter rearing habitat and floodplain areas.	3	5	California Coastal Conservancy, Campbell Timberland Management	8.00	8.00	8.00	8.00	8.00	40	This may be a GIS exercise with ground truthing. Available information exists from past habitat typing that may streamline this analysis and further reduce the overall cost.
CaC-A-2.1.2	Recovery Action	Floodplain	Target habitat restoration and enhancement that will function between winter base flow and flood stage.	3	30	California Coastal Conservancy, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NOAA RC, Private Landowners						TBD	Increased LWD frequencies may provide the winter habitat targeted by this action.
CaC-A-2.1.3	Recovery Action	Floodplain	Promote restoration projects designed to create or restore alcove, backchannel, ephemeral tributary, or seasonal pond habitats.	2									
CaC-A-2.1.3.1	Action Step	Floodplain	Enhance and restore estuary function by improving complex habitat features.	2	20	California Coastal Conservancy, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, Private Landowners						TBD	Cost will depend on number and type of project implemented.
CaC-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.										
CaC-A-6.1.1	Recovery Action	Pool Habitat	Install or enhance existing LWD, boulders, and other instream features to increase habitat complexity and improve pool frequency and depth (DFG 2004). Work with Jackson Demonstration State Forest and USFS staff to implement projects that improve habitat complexity.										
CaC-A-6.1.1.1	Action Step	Pool Habitat	Install properly sized large woody debris to appropriate viability table targets.	2	60	CDFG, NMFS						TBD	promoting restoration actions is not expected to entail high costs.
CaC-A-6.1.1.2	Action Step	Pool Habitat	Encourage landowners to implement restoration projects as part of their ongoing operations in stream reaches where large woody debris is lacking.	2	30	Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NOAA RC, Private Landowners						TBD	Cost is dependent on the number, location and type of restoration action.
CaC-A-6.1.2	Recovery Action	Pool Habitat	Identify historic CCC coho salmon habitats lacking in channel complexity, and promote restoration projects designed to create or restore complex habitat features that provide for localized pool scour, velocity refuge, and cover. Prioritize Core areas first followed by Phase I areas.	2	10	CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners	20.00	20.00	20.00	20.00	20.00	200	Estimate of 20k per year to assess coho habitat.
CaC-A-8.1	Objective	Sediment	Improve habitat conditions at multiple life stages by reducing sediment inputs to the stream at the watershed scale.										
CaC-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. Restoration projects that upgrade or decommission high risk roads in Core CCC coho salmon areas should be considered an extremely high priority for funding (e.g., PCSRF).										

Caspar Creek (Lost Coast-Navarro Point) 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	
CaC-A-8.1.1.1	Action Step	Sediment	Implement the Jackson Demonstration State Forest Road Management Plan.	1	5	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest						0	The cost of implementing the plan will likely be low, since the plan already exists and costs will be absorbed into existing management activities.
CaC-A-8.1.1.2	Action Step	Sediment	Provide incentives to restore high priority sites as determined by watershed analysis, DFG, or the Jackson Demonstration State Forest EIR.	1	2	CalFire, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Cost is difficult to estimate at this time.
CaC-A-8.1.1.3	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	5	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						TBD	TBD- difficult to estimate cost because assessments for the magnitude of the problem were not available.
CaC-A-8.1.2	Recovery Action	Sediment	Implement actions that minimize sediment delivery from road surfaces during the winter period.										
CaC-A-8.1.2.1	Action Step	Sediment	Close unauthorized trails and conduct appropriate decommissioning practices. Hydrologically disconnect trails from associated waterways.	2	5	CalFire, CDFG, Mendocino County, NMFS, RWQCB						TBD	Cost will likely be low since work will likely be absorbed by agency personnel.
CaC-A-8.1.2.2	Action Step	Sediment	Work with landowners to assess the effectiveness of erosion control measures throughout the winter period.	2	10	Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Cost is difficult to estimate at this time.
CaC-A-8.1.2.3	Action Step	Sediment	Permitting agencies (State, Federal, and local) should evaluate all authorized erosion control measures during the winter period.	3	60	Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Much of the watershed has been habitat typed. New habitat assessment methods may have future (unknown) costs.
CaC-A-9.1	Objective	Viability	Monitor population status for response to recovery actions.										
CaC-A-9.1.1	Recovery Action	Viability	Continue ongoing juvenile sampling efforts in the watershed. Establish consistent reporting methods to ensure ESU-wide consistency.	1	60	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						TBD	
CaC-A-9.1.2	Recovery Action	Viability	Continue funding of lifecycle station operated by DFG.	1	60	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						TBD	
CaC-A-20.1	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.										

Caspar Creek (Lost Coast-Navarro Point) 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	
CaC-A-20.1.1	Recovery Action	Logging and Wood Harvesting	Minimize sediment-related effects to coho salmon habitat arising from road building and other land-disturbing activities.										
CaC-A-20.1.1.1	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.	3	60	CalFire, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Cost of future sampling efforts is dependent on the number, location and frequency of sampling efforts.
CaC-A-20.1.1.2	Action Step	Logging and Wood Harvesting	Implement the Jackson Demonstration State Forest Road Management Plan.	3	60	CalFire, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Cost of future sampling efforts is dependent on the number, location and frequency of sampling efforts.
CaC-A-20.1.1.3	Action Step	Logging and Wood Harvesting	Extend the monitoring period and upgrade THP road maintenance after harvest.	2	20	Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Costs will vary with THP activity and additional maintenance needed.
CaC-A-20.1.1.4	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.	1	20	Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners	100	100	100	100	100	2,000	Estimate to decommission riparian roads.
CaC-A-20.1.1.5	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.	3	60	CalFire, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Cost of additional review and loss of merchantable trees is unknown.
CaC-A-20.2	Objective	Logging and Wood Harvesting	Manage timberlands to establish a diverse forest environment exhibiting properly functioning instream habitat, and implement restoration actions where degraded habitat is limiting coho salmon production.										
CaC-A-20.2.1	Recovery Action	Logging and Wood Harvesting	Conserve and manage forestlands for older forest stages.	2	60	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						tbd	the cost of this action may be minimal depending on the land-use philosophy of landowner.
CaC-A-20.2.2	Recovery Action	Logging and Wood Harvesting	Conduct conifer release to promote growth of larger diameter trees where appropriate.	2	60	Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						tbd	minimal costs
CaC-A-20.2.3	Recovery Action	Logging and Wood Harvesting	Encourage Jackson Demonstration State Forest and USFS to implement restoration projects as part of their ongoing practices in priority stream reaches and where LWD is found lacking.	2	10	CDFG, Jackson Demonstration State Forest, NMFS	20.00	20.00	20.00	20.00	20.00	200	Cost based on 4 projects of 50k.

Caspar Creek (Lost Coast-Navarro Point) 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	
CaC-A-20.3	Objective	Logging and Wood Harvesting	Establish greater oversight and post-harvest monitoring by the permitting agency for operations within Core, Phase I and Phase II CCC coho salmon areas.										
CaC-A-20.3.1	Recovery Action	Logging and Wood Harvesting	Assign NMFS staff to conduct THP reviews of the highest priority areas using revised "Guidelines for NMFS Staff when Reviewing Timber Operations: Avoiding Take and Harm of Salmon and Steelhead" (NMFS 2004).	2	10	NMFS	70.00	70.00	70.00	70.00	70.00	700	
CaC-A-20.3.2	Recovery Action	Logging and Wood Harvesting	Provide information to BOF regarding CCC coho salmon priorities and recommend upgrading relevant forest practices.	2	4	CalFire, NMFS	7.50	7.50	7.50	7.50		30	cost is expected to be minimal.
CaC-A-20.4	Objective	Logging and Wood Harvesting	The priorities in this recovery plan should serve as a guide for independent Forest Certification.										
CaC-A-20.4.1	Recovery Action	Logging and Wood Harvesting	Investigate opportunities to programmatically permit the forest certification program to authorize incidental take for landowners through Section 10(a)(1)(B).	2	4	CalFire, NMFS	7.50	7.50	7.50	7.50		30	cost is expected to be minimal.
CaC-A-20.5	Objective	Logging and Wood Harvesting	Monitor coho salmon population and habitat status to determine if restoration actions and timber management modifications are having the desired effect.	2									
CaC-A-20.5.1	Recovery Action	Logging and Wood Harvesting	Continue the activities of the North Coast Watershed Assessment /Coastal Watershed Program.	2	4	CalFire, NMFS	7.50	7.50	7.50	7.50		30	cost is expected to be minimal.
CaC-A-20.5.2	Recovery Action	Logging and Wood Harvesting	Develop a framework similar to Washington State that establishes a scientific framework for monitoring the effectiveness of practices in meeting watershed process goals and a decision-making process that is adaptive to the new information.	2	60	CalFire, CDFG, Jackson Demonstration State Forest, Private Landowners						TBD	The cost of continued education for Jackson State Forest staff is expected to be minimal.
CaC-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.										
CaC-A-24.1.1	Recovery Action	Roads and Railroads	Continue education of Jackson Demonstration State Forest staff and private logging contractors regarding watershed processes and the adverse effects of improper road construction and maintenance on salmonids and their habitats.	2	60	CalFire, CDFG, Jackson Demonstration State Forest, Private Landowners						TBD	The cost of continued education for Jackson State Forest staff is expected to be minimal.
CaC-A-24.1.2	Recovery Action	Roads and Railroads	Develop a Salmon Certification Program for road maintenance staff.	3	5	CalFire, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, Mendocino County Department of Public Works, NMFS, Private Landowners						tbd	cost is unknown, but should be <$50k.
CaC-A-24.2	Objective	Roads and Railroads	Minimize sediment input from existing road networks into the aquatic environment.										
CaC-A-24.2.1	Recovery Action	Roads and Railroads	Conduct actions that hydrologically disconnect roads in Core areas within five years (from 2010).										
CaC-A-24.2.1.1	Action Step	Roads and Railroads	Install sediment traps for pretreatment, and a modified culvert system that can act as an efficient detention system.	2	60	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						tbd	

Caspar Creek (Lost Coast-Navarro Point) 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	
CaC-A-24.2.1.2	Action Step	Roads and Railroads	Evaluate and remove roadside berms that lead to increased runoff velocities and result in increased sediment discharge.	3	60	Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Most of the watershed has been habitat typed. New habitat assessment methods may have future (unknown) costs.
CaC-A-24.2.1.3	Action Step	Roads and Railroads	Establish adequate spoils storage sites throughout the watershed so that material from landslides and road maintenance can be stored safely away from coho streams. Coordinate these efforts with all landowners in the watershed, CalTrans, and county road maintenance staff as appropriate.	2	60	CalFire, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, Mendocino County Department of Public Works, Private Landowners						0	These areas are likely already established. Efforts should be made to coordinate storage with all landowners in the basin to minimize costs and impacts.
CaC-A-24.2.2	Recovery Action	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.										
CaC-A-24.2.3	Recovery Action	Roads and Railroads	Design and implement a program of BMPs for road maintenance on private roads similar to the proposed program for public roads.	3	5	CalFire, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	The cost of developing the plan is difficult to precisely estimate, but may be less than $100k.
CaC-A-24.2.4	Recovery Action	Roads and Railroads	Licensed engineering geologists should review and approve grading on inner gorge slopes.	2	60	CalFire, California Coastal Conservancy, CalTrans, Campbell Timberland Management, CDFG, FishNet 4C, Jackson Demonstration State Forest, Mendocino County Department of Public Works, NOAA RC, Private Landowners, RCD						TBD	Similar existing programs could be modified and implemented at minimal cost.
CaC-A-24.2.5	Recovery Action	Roads and Railroads	Restoration projects that upgrade or decommission high risk roads in Core areas should be considered an extremely high priority for funding (e.g., PCSRF). Where no Core areas are designated, apply this action to Phase I areas.	2	5	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners	600	600	600	600	600	3,000	TBD- difficult to estimate cost because assessments for the magnitude of the problem were not available. Additionally, many roads in Core watersheds have been addressed - often through the timber harvest process - and these costs should be considered an ongoing operation expense.
CaC-A-24.2.6	Recovery Action	Roads and Railroads	Minimize sediment delivery from roads during the winter period.										
CaC-A-24.2.6.1	Action Step	Roads and Railroads	Limit winter use of unsurfaced roads and recreational trails by unauthorized individuals and impacting uses to decrease fine sediment loads.	1	60	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners, Public						0	

Caspar Creek (Lost Coast-Navarro Point) 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	
CaC-A-24.2.6.2	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.	3	60	CalFire, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, NMFS, Private Landowners						TBD	Cost is difficult to estimate due to the uncertainty in developing and implementing the program.
CaC-A-24.2.7	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	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						TBD	
CaC-A-24.2.8	Recovery Action	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.	1	20	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						TBD	Additional information is required to estimate cost of culvert upgrades.
CaC-A-24.2.9	Recovery Action	Roads and Railroads	Reduce sediment sources from road networks and other actions that deliver sediment to stream channels through improved or new laws and policy.	2	20	California Department of Mines and Geology, Campbell Timberland Management, CDFG, Jackson Demonstration State Forest, Private Landowners						TBD	Need additional analysis to make accurate estimate of remediating sediment from road network.
CaC-A-24.2.9.1	Action Step	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.	1	60	CalFire, California Department of Mines and Geology, Campbell Timberland Management, Jackson Demonstration State Forest, Private Landowners						TBD	Costs likely to be incurred as part of timber harvest operations. However, in some circumstances this may be a stand alone cost.
CaC-A-24.3	Objective	Roads and Railroads	Ensure all existing and new road crossings allow upstream and downstream passage for coho salmon.										
CaC-A-24.3.1	Recovery Action	Roads and Railroads	Identify high priority barriers and restore passage per NMFS' Guidelines for Salmonid Passage at Stream Crossings (NMFS 2001a).	2	20	Mendocino County, NMFS						0	Existing authorities of permitting agencies facilitate implementation at minimal costs.
CaC-A-24.3.2	Recovery Action	Roads and Railroads	Use NMFS Guidelines for Salmonid Passage at Stream Crossings (NMFS 2001a) and appropriate barrier databases when developing new or retrofitting existing road crossings.	2	60	CalFire, Campbell Timberland Management, Jackson Demonstration State Forest, Mendocino County Department of Public Works, Private Landowners						0	