GUALALA RIVER

Gualala River

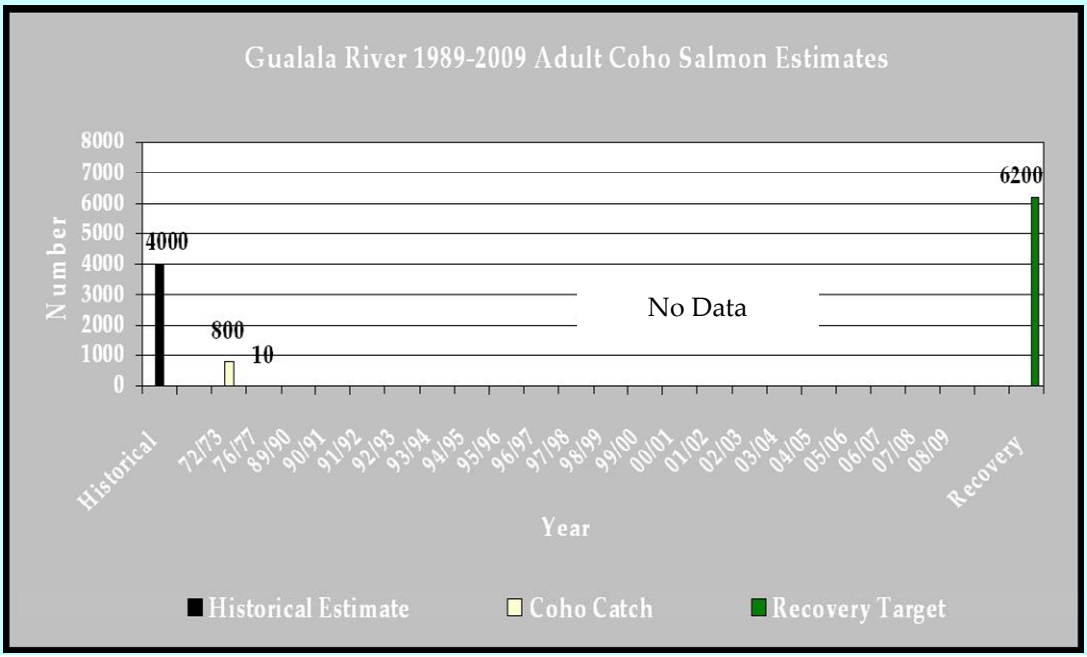
Independent Population
251.6 IP-Km of potential coho salmon habitat
Coho salmon and steelhead present

Gualala River drains approximately 298 square miles of western Mendocino and Sonoma counties, and enters the Pacific Ocean at Gualala. During summer months, a sand bar typically forms across the mouth of the estuary which blocks the flow of tidewater creating a coastal lagoon. Approximately 52 percent of the Gualala River watershed is coniferous forest (redwood, 36 percent, and Douglas-fir, 11 percent), ~ 31 percent is montane hardwood, and 16 percent is annual grassland. Twenty-nine percent of the watershed has very low to intermediate susceptibility to soil erosion, while the remaining 71 percent has moderately-high to high susceptibility to erosion. The EPA listed the Gualala as having water quality impaired for sediment, and identified from timber harvest as the main contributor. The EPA established a TMDL for the watershed. Most of the Gualala River watershed is privately owned; less than one percent is state park land or owned by the U.S. Bureau of Indian Affairs. Land use in the watershed is dominated by timber production, which began in 1862. Within the past ten years, about 13 percent of the watershed has been under a timber harvest plan. Agriculture is a significant land use in the Gualala, with vineyards becoming increasingly widespread as well as in-stream gravel mining Housing development within the watershed is moderately low; approximately 890 housing units are present in the watershed. There are 46 barriers within the watershed that impede or block salmon migration caused by dams, diversions, road crossings, and natural barriers. Impassable barriers block salmonids for less than ten percent of the watershed.

Gualala River.
Photo by Bob Coey, NMFS.

The Watershed at a Glance

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



Gualala River

Recovery Target: 6,200 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
- Agriculture
- Droughts

Preventing the extinction of coho salmon

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

- Increase pool habitat complexity and frequency of pools
- Increase frequency of off channel habitat
- Increase the amount of large woody debris in streams
- Increase riparian shade to cool streams
- Reduce road density in riparian areas and across the watershed.
- Improve gravel quality (high loads of fine sediment)
- Increase size of riparian trees
- Reduce turbidity

Wide and shallow riffle in the Gualala River
Photo provided by KRIS Information System, and is used with permission

Advancing recovery of coho

salmon in Gualala River requires these priority **recovery actions:**

- Decommission riparian road systems and/or upgrade roads (and skid trails on forestlands) that deliver sediment to adjacent watercourses to decrease fine sediment.
- Identify high priority barriers and restore passage per NMFS' fish passage guidelines.
- Work with SWRCB and landowners to re-establishing base flows throughout the year. Identify unauthorized water uses and non-compliant bypass flows to protect coldwater input to the main stem and estuaries.
- Conduct programs to purchase water rights to improve surface stream flows.
- . . . in these **core areas:** Robinson Creek and Doty Creek planning watersheds.

Conservation Highlights

- The Gualala River Watershed Council (GRWC) has worked with landowners to conduct sediment reduction projects that have prevented more than 15,000 dump truck loads of sediment from polluting streams.
- GRWC has installed 70 stream temperature monitoring stations throughout the watershed.
- GRWC conducts annual surveys of fish and aquatic and riparian habitat. GRWC completed the first scientific study of the Gualala River Estuary.
- Gualala Redwood Company has installed many instream LWD structures on the North Fork Gualala River

We Need Your Photo Here

Gualala River
Photo © Your Name Here, AFFIL

Immediate Needs

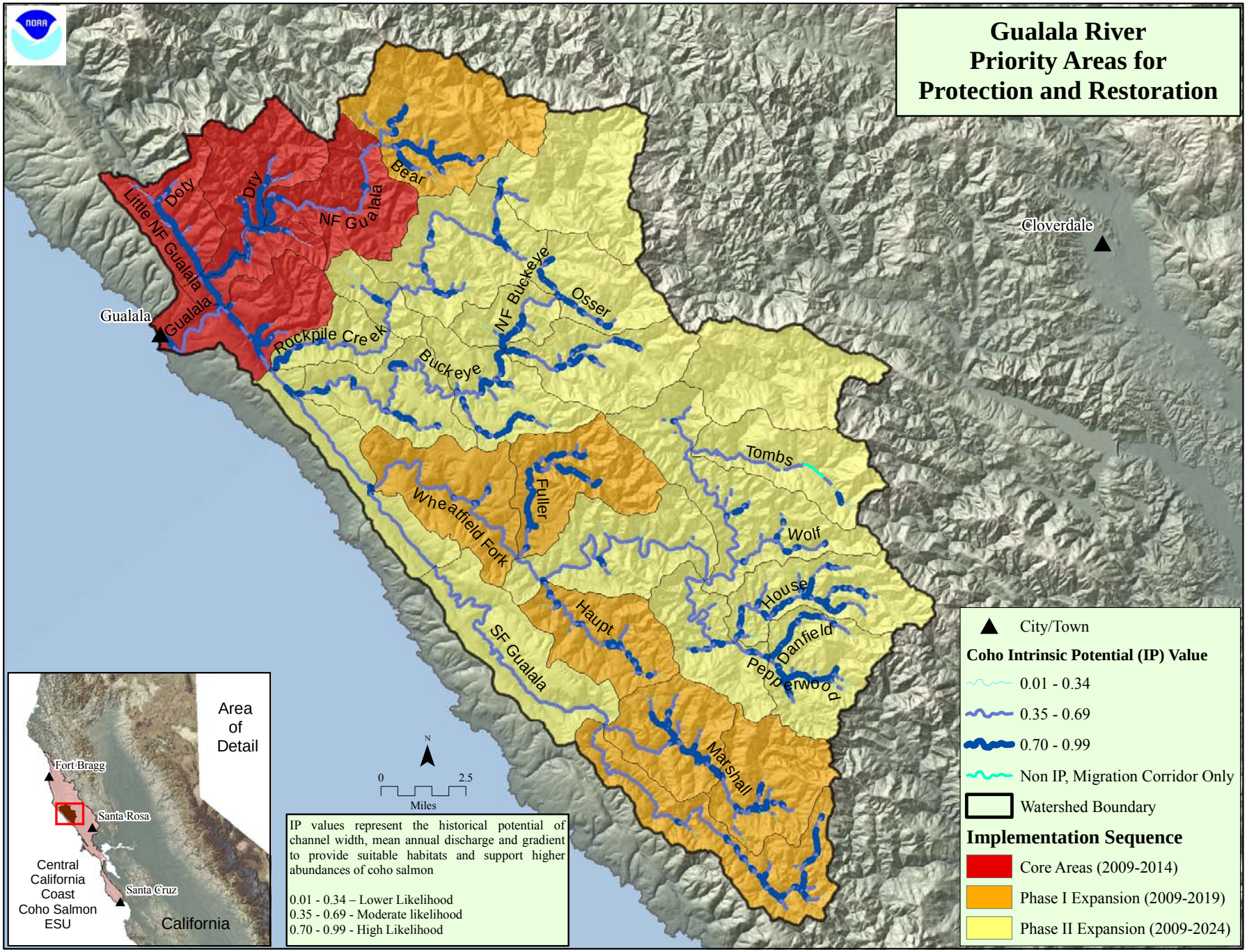
√ Continue effective GRWC collaborative restoration efforts to reduce sediment inputs to streams.

√ Watershed stakeholders need to convene a group to address water diversion issues and develop alternatives to reduce impacts to stream base flow, including alternative frost protection actions, and programs to purchase water rights.

√ Support the ongoing efforts of the Gualala Redwoods Company to increase LWD abundance, and to upgrade or decommission roads.

Recovery Partners

NMFS
DFG
Gualala River Watershed Council
Gualala Redwood Company


Gualala River
Priority Areas for
Protection and Restoration
Cloverdale
Gualala
Little NF Gualala
Doty
Dry
NF Gualala
Bear
Rockpile Creek
Buckeye
NF Buckeye
Osser
Tombs
Wolf
House
Danfield
Pepperwood
Fuller
Wheatfield Fork
Haupt
SF Gualala
Marshall
City/Town
Coho Intrinsic Potential (IP) Value
0.01 - 0.34
0.35 - 0.69
0.70 - 0.99
Non IP, Migration Corridor Only
Watershed Boundary
Implementation Sequence
Core Areas (2009-2014)
Phase I Expansion (2009-2019)
Phase II Expansion (2009-2024)
N
0
2.5
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
Area of Detail
Fort Bragg
Santa Rosa
Santa Cruz
Central California Coast Coho Salmon ESU
California

CCC Coho Salmon
Gualala River
CAP Viability Table Results

Analyst	Source	Result	Rating	Target	Habitat Attribute	Indicator	Poor	Fair	Good	Very Good
Flow Panel	Decision Matrix	58	Fair	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	7,817 m^2	Fair	Spawning Adults	Sediment	Amount of Gravel*	<1100 m^2	1100-8600 m^2	8600-16100 m^2	>16100 m^2
NMFS	Best Prof. judgment	>10% of pop.	Poor	Spawning Adults	Viability	Freshwater Harvest	>10% of pop.	5-10%	<5%	
Flow Panel	Decision Matrix	67	Fair	Eggs	Hydrology	Instantaneous Condition	>75 (score)	51-75	35-50	<35
Flow Panel	Decision Matrix	75	Fair	Eggs	Hydrology	Redd Scour	>75 (score)	51-75	35-50	<35
SEC	Many Sources	NA	Fair	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	59%	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	75	Fair	Summer Rearing	Hydrology	Baseflow	>75 (score)	51-75	35-50	<35
SEC	CDFG HAB 8	32.9	Poor	Summer Rearing	Pool Habitat	Shelter Rating	<60 avg. rating	60-80	80-100	>100
SEC	CDFG HAB 8	6%	Poor	Summer Rearing	Pool Habitat	Primary Pools	<30% pools by length	30-40%	40-50%	>50%
SEC/NMFS	Many Sources	NA	Poor	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	19.8	Poor	Winter Rearing	Floodplain	Complex Habitat**	<50% Connected	50-80% connected	>80% connected	
NMFS	NCWAP	Good	Good	Smolts	Estuary	Estuary				
Flow Panel	Decision Matrix	51-75	Fair	Smolts	Hydrology	Passage Flows	>75 (score)	51-75	35-50	<35
SEC	SWRCB	0.24/10 IP-km	Good	Smolts	Passage	# of Diversions**	>5 / 10 IP km	1.1-5	0.01-1	0
SEC	CDFG HAB 8	32.9	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	35%	Poor	Multiple Life Stages	Hydrology	Stand Age			>40 years old	
SEC	NLCDB	0.12%	Very Good	Multiple Life Stages	Hydrology	Impervious Surfaces	>12.01% of WS by area	7.01-12%	3.01-7%	0-3%
SEC	FMMP	1.01%	Good	Multiple Life Stages	Land disturbance	Agriculture	>30% of WS by area	10-30%	0.1-10%	<0.1%
NMFS	CDF THP Dataset	12%	Good	Multiple Life Stages	Land disturbance	Timber Harvest	>35% of WS by area	25 - 35%	10 - 25%	<10%
SEC	Many Sources	6.4	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	3.0	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	25-50%	Fair	Multiple Life Stages	Riparian Veg.	Species Composition	<25%	25-50%	>50%	Historical Conditions
NMFS	CDF CWHR	37%	Poor	Multiple Life Stages	Riparian Veg.	DBH	<39% Class 5 and 6	40-54%	55-69%	>69%
SEC	CDFG HAB 8	65%	Fair	Multiple Life Stages	Riparian Veg.	Canopy Cover	<45 % avg. over IP-km	75-85%	85-95%	>95%
NMFS	CDF THP Dataset	4.8 mi/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	4.1 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 fish/m^2	Poor	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	<20% IP-km occupied	Poor	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

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

Gualala River (Navarro Point-Gualala 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	
GuR-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.										
GuR-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.										
GuR-A-3.1.1.1	Action Step	Hydrology	Identify and work with the SWRCB to eliminate depletion of summer base flows from unauthorized water uses.	1	5	CDFG, NMFS, Private Landowners, SWRCB	50.00	50.00	50.00	50.00	50.00	250	Cost estimate of 50K per year for agency staff.
GuR-A-3.1.1.2	Action Step	Hydrology	Monitor, identify problems, and prioritize needed changes to permitted water diversions on current or potential coho streams.	2	10	BLM, CDFG, NMFS, North Gualala Water Company, Private Landowners, Sea Ranch, SWRCB	25.00	25.00	25.00	25.00	25.00	250	Cost assumes a partial person year from SWRCB or other agency.
GuR-A-3.1.1.3	Action Step	Hydrology	Require streamflow gauging devices to determine the level of impairment to natural flow.	3	60	CDFG, NMFS, USGS						TBD	Provide consistent funding for the North Fork Gualala River and possible funding for the Wheatfield Forks of the Gualala River.
GuR-A-3.1.2	Recovery Action	Hydrology	Improve compliance with existing water resource regulations via monitoring and enforcement.										
GuR-A-3.1.2.1	Action Step	Hydrology	Enforce existing by-pass flow permit conditions of water diversions to protect coldwater input to the mainstem and estuary.	1	20	CDFG, NMFS, North Gualala Water Company, Private Landowners, Sea Ranch, SWRCB	25.00	25.00	25.00	25.00	25.00	500	Estimates 25K per year to enforce water rights conditions.
GuR-A-3.1.2.2	Action Step	Hydrology	Require compliance with the most recent update of NMFS' Water Diversion Guidelines.	2	60	Private Landowners, Water Agencies						TBD	Additional analysis needed to determine cost of meeting NMFS guidelines.`
GuR-A-3.1.2.3	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, North Gualala Water Company, Sea Ranch, SWRCB						0	Improved coordination is expected to be a minimal cost.
GuR-A-3.1.2.4	Action Step	Hydrology	Map all water diversions and upgrade the existing water rights information system so that water allocations can be readily quantified by watershed.	2	60	CDFG, NMFS, North Gualala Water Company, Private Landowners, Sea Ranch, SWRCB						TBD	Costs may be minimal due to the low number of diverters in this basin.
GuR-A-3.1.3	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.										
GuR-A-3.1.3.1	Action Step	Hydrology	Regulate the use of streamside wells.	2	60	SWRCB						TBD	Estimate of a partial person year to accomplish this task.
GuR-A-3.1.3.2	Action Step	Hydrology	Promote off-channel storage to reduce impacts of water diversion (e.g. storage tanks for rural residential users).	2	20	CDFG, North Gualala Water Company, Private Landowners, Sea Ranch, SWRCB	10.00	10.00	10.00	10.00	10.00	200	Promoting these type of projects will require a sustained effort to target willing landowners in critical stream reaches.
GuR-A-3.1.3.3	Action Step	Hydrology	Provide incentives to water rights holders willing to convert some or all of their water right to instream use via petition change of use and §1707 (DFG 2004).	2	60	CDFG, NOAA RC, SWRCB						0	Costs are expected to be minimal as some of these efforts will be part of existing programs, however some technical assistance may be necessary from a variety of agencies.
GuR-A-3.1.3.4	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	5	CDFG, NMFS PRD, NOAA RC, Private Landowners						0	Evaluation costs are expected to be minimal.

Gualala River (Navarro Point-Gualala 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	
GuR-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.										
GuR-A-6.1.1	Recovery Action	Pool Habitat	Develop a Large Wood Recruitment Plan that assesses instream wood needs, and sites potentially responsive to wood recruitment or placement, and develop a riparian strategy to ensure long term natural recruitment of wood via large tree retention.										
GuR-A-6.1.1.1	Action Step	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	20	CDFG, NOAA RC, Private Landowners						TBD	Continue current restoration projects in progress.
GuR-A-6.1.1.2	Action Step	Pool Habitat	Encourage coordination of LWD placement in streams as part of logging operations and road upgrades to maximize size, quality, and efficiency of effort (DFG 2004).	2	20	CalFire, CDFG, NOAA RC, Private Landowners						0	Cost to coordinate projects is expected to be low.
GuR-A-6.1.1.3	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	60	CDFG, NOAA RC, Private Landowners						0	Minimal cost expected.
GuR-A-6.1.2	Recovery Action	Pool Habitat	Promote restoration projects designed to create or restore alcove, backchannel, ephemeral tributary, or seasonal pond habitats.										
GuR-A-6.1.2.1	Action Step	Pool Habitat	Place instream structures to improve pool depth and habitat complexity.	1	20	CDFG, NOAA RC, Private Landowners						TBD	Need to determine current restoration status and develop cost estimate for remaining work.
GuR-A-6.1.2.2	Action Step	Pool Habitat	Promote bio-engineering solutions as appropriate for bank protection projects.	2	60	CDFG, NRCS, Private Landowners, RCD, Sonoma County						TBD	Cost will vary over time. Cost to support bioengineering low.
GuR-A-6.1.3	Recovery Action	Pool Habitat	Maintain current LWD, boulders, and other structure-providing features to maintain current stream complexity, pool frequency, and depth (DFG 2004).	1	60	CDFG, NMFS, NRCS, Private Landowners						0	Cost to maintain LWD is expected to be minimal.
GuR-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.										
GuR-A-7.1.1	Recovery Action	Riparian Vegetation	Conserve and manage forestlands for older forest stages.										
GuR-A-7.1.1.1	Action Step	Riparian Vegetation	Promote streamside conservation measures, including conservation easements, setbacks, and riparian buffers (DFG 2004).	3	25	CDFG, NOAA RC, Private Landowners, Sonoma County						TBD	Associated costs per acre can be highly variable. Costs for timberlands ranged from $54 to $279 per acre (DFG 2004), and costs in Sonoma County are likely much higher and cannot be accurately determined at this time.
GuR-A-7.1.2	Recovery Action	Riparian Vegetation	Restore and expand riparian buffers to increase riparian canopy cover.										
GuR-A-7.1.2.1	Action Step	Riparian Vegetation	Locate and utilize sources of native seed and cuttings for planting stock.	3	60	NRCS, Private Consultants, Private Landowners, Sonoma County						TBD	Need additional information to develop cost estimate.
GuR-A-7.1.2.2	Action Step	Riparian Vegetation	Plant native vegetation to promote streamside shade.	2	30	CDFG, NOAA RC, Private Landowners						TBD	Project specific information for specific riparian restoration is needed for cost estimate.
GuR-A-7.1.2.3	Action Step	Riparian Vegetation	Prioritize and fence riparian areas from grazing (using fencing standards that allow other wildlife to access the stream).	2	20	NOAA RC, Private Landowners						TBD	More site specific project information is needed.
GuR-A-8.1	Objective	Sediment	Improve habitat conditions at multiple life stages by reducing sediment inputs to the stream at the watershed scale.										
GuR-A-8.1.1	Recovery Action	Sediment	Re-establish natural sediment delivery processes by assessing sediment delivery sources at the sub-watershed scale and prioritizing sediment reduction activities.										

Gualala River (Navarro Point-Gualala 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	
GuR-A-8.1.1.1	Action Step	Sediment	Develop a Road Sediment Reduction Plan that prioritizes sites and outlines implementation and a timeline of necessary actions. Can be implemented as part of a program that reduces sediment sources from roads.	1		CDFG, NOAA RC, Private Landowners, RWQCB							Prioritize funding for North Fork Core area with areas along the South Fork Phase 1 areas having the next highest priority.
GuR-A-8.1.1.2	Action Step	Sediment	Treat high priority slides and landings identified in credible landowner assessments.	1	20	CDFG, NOAA RC, Private Landowners						TBD	Cost estimated at 2-3 million for priority sediment sites. Site specific information needed for a accurate cost estimate.
GuR-A-8.1.1.3	Action Step	Sediment	Permitting agencies (State, Federal, and local landowners) should evaluate all authorized erosion control measures during the winter period.	2	5	CDFG, NMFS, Private Landowners, RWQCB	20.00	20.00	20.00	20.00	20.00	100	Rough cost estimate to conduct field assessments.
GuR-A-9.1	Objective	Viability	Develop and implement a monitoring program to evaluate the performance of recovery efforts.										
GuR-A-9.1.1	Recovery Action	Viability	Measure or estimate the condition of key attributes across the watershed.										
GuR-A-9.1.1.1	Action Step	Viability	Use standardized watershed assessments within sub-watersheds to define limiting factors specific to those areas. Encourage all major landowners to use similar assessment methods.	2	60	CDFG, NMFS, Private Landowners, RCD						TBD	Use Coastal Monitoring Plan methods.
GuR-A-9.1.2	Recovery Action	Viability	Monitor population status for response to recovery actions.										
GuR-A-9.1.2.1	Action Step	Viability	Continue and improve upon monitoring activities to determine the population status of adult and smolt salmonids in the watershed and its tributaries.	2	60	CDFG, NMFS, Private Landowners, RCD						TBD	Use Costal Monitoring Plan methods.
GuR-A-10.1	Objective	Water Quality	Improve summer rearing survival by reducing instream temperatures in potential rearing reaches. Also see strategies for restoring and enhancing riparian vegetation.										
GuR-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).										
GuR-A-10.1.1.1	Action Step	Water Quality	Modify policies and regulations to protect riparian corridors, and maintain channel integrity.	1	60	Board of Forestry, CalFire, CDFG, NMFS						TBD	To estimate cost of additional regulations and loss of timber resources in corridors additional analysis is required.
GuR-A-10.1.1.2	Action Step	Water Quality	Improve riparian and instream conditions in rearing habitats by establishing riparian protection zones that extend the distance of a site potential tree height from the outer edge of a channel.	2	60	Board of Forestry, CalFire, CDFG, NMFS						TBD	Loss of timber resources as a result of riparian protection zones can not estimated at this time.
GuR-A-10.1.2	Recovery Action	Water Quality	Conduct programs to purchase water rights to improve surface flows during the summer period.	1	10	CDFG, NMFS, Private Landowners, SWRCB						TBD	Cost is likely greater than 500 dollars per acre foot.
GuR-A-11.1	Objective	Agricultural Practices	Control or abate the development of vineyards or other agricultural activities that impact coho salmon in the next ten years.	1	10	Board of Forestry, CalFire, CDFG, NMFS, Sonoma County						TBD	Regulatory costs and socioeconomic costs associated with this action cannot be estimated at this time.
GuR-A-11.2	Objective	Agricultural Practices	Improve education and awareness of agencies, landowners and the public regarding salmonid protection and habitat requirements.										
GuR-A-11.2.1	Recovery Action	Agricultural Practices	Work within the agricultural community to educate landowners and enhance practices that provide for functional watershed processes.	3	20	Farm Bureau, FishNet 4C, Private Landowners, Sonoma County						0	Relatively low cost is expected to work with agricultural community.
GuR-A-11.3	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.										
GuR-A-11.3.1	Recovery Action	Agricultural Practices	Implement the NRCS/RCD coordinated program for fishery restoration practices.	2	60	CDFG, NMFS, NRCS, Private Landowners, RCD, USACE						0	Low cost expected because these programs are currently in place.
GuR-A-11.4	Objective	Agricultural Practices	Promote agricultural practices that protect and restore habitats for CCC coho salmon.										

Gualala River (Navarro Point-Gualala 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	
GuR-A-11.4.1	Recovery Action	Agricultural Practices	Address sources from agricultural actions that deliver sediment and runoff to stream channels.										
GuR-A-11.4.1.1	Action Step	Agricultural Practices	Investigate effects to coho salmon of conversion of timberland and oak woodlands in the Gualala River (DFG 2004).	2	2	CalFire, CDFG, Private Consultants, Private Landowners	25.00	25.00				50	Rough estimate to conduct pilot study.
GuR-A-11.4.1.2	Action Step	Agricultural Practices	Work with vineyard owners to assess the effectiveness of erosion control measures throughout the winter period.	3	5	CalFire, CDFG, NMFS, RWQCB, Sonoma County	10.00	10.00	10.00	10.00	10.00	50	Cost estimate for field work by agency or other staff.
GuR-A-11.4.2	Recovery Action	Agricultural Practices	Maintain and enhance riparian stream buffer areas near agricultural activities that allow functional riparian areas to develop.	2	20	FishNet 4C, NOAA RC, Private Landowners, Sonoma County						TBD	Additional information needed on the size and scope of projects in order to estimate cost.
GuR-A-11.4.3	Recovery Action	Agricultural Practices	Promote off-channel storage to reduce impacts of water diversion (e.g. winter diversion to ponds).	1	10	CalFire, CDFG, NMFS, NMFS OLE, Private Landowners, Sonoma County, SWRCB						TBD	Low cost to promote. Implementation likely 1-2 million based on recent Russian River costs to develop off-channel storage.
GuR-A-15.1	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.										
GuR-A-15.1.1	Recovery Action	Droughts	Establish an emergency drought operations center (EDOC), (e.g., Washington Department of Fish and Wildlife, 2001), comprised of the SWRCB, DFG, NMFS, and others to develop emergency rules for augmenting water supplies and mitigating the effects of drought on fish.										
GuR-A-15.1.1.1	Action Step	Droughts	Use the emergency drought operations center (EDOC) or other similar group to oversee implementation of water conservation measures and alternatives; coordinate law enforcement actions to minimize water use and promote CalTIP help discourage poaching.	2	60	CDFG, CDFG Law Enforcement, NMFS OLE, North Gualala Water Company, Private Landowners, Public, Sea Ranch, Sonoma County						TBD	Need additional analysis to estimate cost which will vary with drought frequency.
GuR-A-15.1.1.2	Action Step	Droughts	Work with DFG, Counties, other agencies, and knowledgeable biologists to develop emergency rules and adopt implementation agreements.	2	10	CDFG, NMFS HCD, North Gualala Water Company, Sea Ranch, Sonoma County Water Agency, SWRCB						0	Cost expected to be low if conducted by existing agency staff.
GuR-A-15.1.1.3	Action Step	Droughts	Increase enforcement patrols by DFG and NMFS OLE in sensitive spawning and rearing areas.	1	10	CDFG Law Enforcement, NMFS OLE	4.00	4.00	4.00	4.00	4.00	40	Cost assumes 2 person team making weekly site investigations throughout the summer.
GuR-A-15.1.2	Recovery Action	Droughts	Minimize water use and seek alternatives during droughts to maintain survival of CCC coho salmon.										
GuR-A-15.1.2.1	Action Step	Droughts	Impose mandatory conservation measures to maintain instream flow needs of CCC coho salmon.	3	10	CDFG, NMFS						0	Prioritizing existing funding mechanisms is not expected to add additional cost to the process.
GuR-A-15.1.2.2	Action Step	Droughts	Identify and work with water users to minimize depletion of summer base flows from unauthorized water uses.	1	60	CalFire, CalTrans, Mendocino County, NMFS, NRCS, Private Landowners, Public, RCD, Sonoma County						TBD	Cost cannot be determined at this time but should be adopted as part of future road actions.
GuR-A-15.1.2.3	Action Step	Droughts	Develop critical flow values that are the basis for minimum bypass flow requirements to support juvenile rearing habitat conditions in the summer and fall months.	2	60	Mendocino County, Sonoma County						TBD	Costs will vary significantly depending on site specific conditions and landowner willingness to have roads addressed.
GuR-A-15.2	Objective	Droughts	Work with land owners or public agencies to acquire water that would be utilized to minimize effects of droughts.										

Gualala River (Navarro Point-Gualala 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
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GuR-A-15.2.1	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	20	CDFG, NMFS HCD, North Gualala Water Company, Private Landowners, Sonoma County Water Agency, SWRCB						TBD	Water rights sellers need to be identified and amount of flow/acre-feet to be purchased for a cost estimate.
GuR-A-20.1	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.										
GuR-A-20.1.1	Recovery Action	Logging and Wood Harvesting	Forestlands supporting Core, Phase I and Phase II priority areas should be considered for purchase (if feasible within the next 5 years).										
GuR-A-20.1.1.1	Action Step	Logging and Wood Harvesting	Should large tracts of forestlands within the Gualala River watershed identified as a Core or Phase I in this recovery plan become available for purchase, the State of California or other entities should consider purchasing the area as a Demonstration Forest or State Park.	2	20	BLM, CalFire, California Coastal Conservancy, CDFG, Conservation Fund, NMFS, Private Landowners, Sonoma County, State Parks, The Nature Conservancy						TBD	Not able to estimate cost at this time.
GuR-A-20.1.2	Recovery Action	Logging and Wood Harvesting	Coordinate with regulatory agencies to minimize conversions in key watersheds and discourage forestland conversions.										
GuR-A-20.1.2.1	Action Step	Logging and Wood Harvesting	Work with Sonoma county planning staff to minimize rezoning forestlands to rural residential or other land uses (e.g., vineyards).	1	60	CalFire, NMFS HCD, Sonoma County						0	Cost low if conducted with current regulatory and County staff.
GuR-A-20.1.2.2	Action Step	Logging and Wood Harvesting	Discourage home building or other incompatible land use in areas identified as timber production zones (TPZ).	3	60	CalFire, CDFG, NMFS, Private Landowners, Sonoma County						TBD	Costs may be low if conducted with existing federal, state and county staff.
GuR-A-20.2	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.										
GuR-A-20.2.1	Recovery Action	Logging and Wood Harvesting	Address sources from timber harvesting operations.										
GuR-A-20.2.1.1	Action Step	Logging and Wood Harvesting	Encourage all permanent and year-round access roads beyond the THP parcel be surfaced after harvest completion with base rock and road gravel, asphalt, or chipseal, as appropriate.	1	60	CalFire, Private Landowners						TBD	See Roads section.
GuR-A-20.2.1.2	Action Step	Logging and Wood Harvesting	Extend the monitoring period and upgrade THP road maintenance after harvest.	2	10	CalFire, CDFG, NMFS PRD, Private Landowners, RWQCB	20.00	20.00	20.00	20.00	20.00	200	Assumes additional monitoring on at least four THPs at 5k per plan.
GuR-A-20.2.1.3	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.	3	20	CalFire, California Department of Mines and Geology, Private Consultants, Private Landowners, RWQCB						TBD	Cost expected to be low because much of this mapping has been completed.

Gualala River (Navarro Point-Gualala 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
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GuR-A-20.2.1.4	Action Step	Logging and Wood Harvesting	Require 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, CDFG, NMFS PRD, Private Consultants, Private Landowners, RWQCB						TBD	Cost can not be determined without information on the number of acres and cost of merchantable timber retention.
GuR-A-20.2.2	Recovery Action	Logging and Wood Harvesting	Conserve and manage forestlands for older forest stages.										
GuR-A-20.2.2.1	Action Step	Logging and Wood Harvesting	Manage riparian areas for their site potential composition and structure.	2	60	Board of Forestry, CalFire, CDFG, NMFS						TBD	Cost of reducing timber available in riparian areas needs to be calculated for estimating cost of this action.
GuR-A-20.3	Objective	Logging and Wood Harvesting	Develop a California Forest Practice monitoring protocol to determine whether specific practices are effectively meeting intended objectives and are providing for the protection of CCC coho salmon.										
GuR-A-20.3.1	Recovery Action	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.										
GuR-A-20.3.1.1	Action Step	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).	1	10	CalFire, NMFS	10.00	10.00	10.00	10.00	10.00	100	Assumes NMFS would expend approximately 10K in staff time each year to review, conduct site visits, and comment on Gualala River watershed THPs.
GuR-A-20.3.2	Recovery Action	Logging and Wood Harvesting	Consider the development of a Watershed Database (similar to the DFG Northern Spotted Owl database) for salmonids that provides watershed data and information in a consistent fashion to all foresters for consideration in their harvest plans.										
GuR-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.										
GuR-A-24.1.1	Recovery Action	Roads and Railroads	Develop a Salmon Certification Program for road maintenance staff.	2	10		5.00	5.00	5.00	5.00	5.00	50	Estimates 5K in cost to certify various staff in the Gualala River watershed.
GuR-A-24.2	Objective	Roads and Railroads	Reduce sediment sources from road networks, maintenance activities, and other actions that deliver sediment to stream channels.										
GuR-A-24.2.1	Recovery Action	Roads and Railroads	Develop a Road Sediment Reduction Plan that prioritizes sites and outlines implementation and a timeline of necessary actions.										
GuR-A-24.2.1.1	Action Step	Roads and Railroads	Conduct road and sediment reduction assessments to identify sediment-related and runoff-related problems and determine level of hydrologic connectivity.	2	5	NRCS, Private Consultants, Private Landowners, RCD						TBD	Cost expected to be low because most areas have been surveyed.
GuR-A-24.2.1.2	Action Step	Roads and Railroads	Design new roads that avoid riparian areas and are hydrologically disconnected from the stream network.	2	60	Private Consultants, Private Landowners, Sonoma County						0	Cost can not be determined at this time.
GuR-A-24.2.2	Recovery Action	Roads and Railroads	Address sediment and runoff sources from road networks and other actions that deliver sediment and runoff to stream channels.										
GuR-A-24.2.2.1	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.	2	5	CDFG, Private Consultants, Private Landowners, RWQCB						TBD	Five years may be sufficient to determine problem segments that would be stormproofed.
GuR-A-24.2.2.2	Action Step	Roads and Railroads	Encourage, when necessary and appropriate, restricted access to unpaved roads in winter to reduce road degradation and sediment release. Where restricted access is not feasible, encourage measures such as rocking to prevent sediment from reaching streams with coho salmon (DFG 2004).	2	20	Private Landowners						TBD	Twenty years is suggested to institutionalize these practices.

Gualala River (Navarro Point-Gualala Point) Threats and Associated Recovery Actions

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GuR-A-24.2.2.3	Action Step	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	Private Landowners, RCD, Sonoma County						TBD	Cost of maintaining upgraded roads will depend on severity of previous winter.
GuR-A-24.2.2.4	Action Step	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.	1	10	FishNet 4C, Private Landowners, RCD						TBD	
GuR-A-24.2.2.5	Action Step	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	10	CDFG, NOAA RC, Private Landowners, RCD, Sonoma County	500	500	500	500	500	5,000	Based on remaining number of miles of roads that have not been upgraded (500 miles) in Core and Phase I recovery areas. Cost per mile estimated at an average of 10K per mile to upgrade or decommission..