

STRESSOR TERMS

Proposed Terms	Ecosystem Restoration Program Plan	San Joaquin River Tech. Team	Sacramento River Tech. Team	American River Tech. Team	North Bay Tech. Team	Delta Tech. Team
Water Diversions	Water Diversions	Stranding	Diversions	Water Diversions	Water diversion for irrigation	Geomorphic Factors - Subsidence
			Flow - Juvenile stranding due to flow reductions	Inadequate Flow - Flow fluctuation (stranding)	Pumping	
					Subsidence	
					Groundwater drawdown	
					Saltwater intrusion	
Flows	Water Diversions	Downstream flows	Impacts from lack of flows	Inadequate Flow - Base flow	Hydrographic change, flushing flows	Flow Constraints
		Flow management (temperature, velocity, depth)	Insufficient flow for channel maintenance	Inadequate Flow - Attraction flow		Flow Constraints - Low flow
		Flow regime	Juvenile stranding due to flow reductions	Inadequate Flow - Flow fluctuation (stranding)		Flow Constraints - Inadequate stream flows (Cosumnes, Calaveras, Mokelumne)
		Inadequate instream flows (for attracting adults, flushing flows for bed maintenance)	Flow - Impacts from flood management practices			
		Delta flows	Flow - Impacts from water management			
		Flow pattern (outflow timing, variability)				
Entrainment		Entrainment (water diversions)	Passage problems - Entrainment at diversions (unscreened)	Water diversions - Entrainment		Entrainment
		Entrainment at Delta export pumps				Entrainment (Mokelumne, Cosumnes, Calaveras)
		Fish screens				

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Migration Barriers	Dams, Reservoirs, Weirs, and Other Human-Made Structures	Migration delays (dissolved oxygen barriers, delta barriers, lack of attraction flows)	Passage Problems - Insufficient flow over riffles	Migration Barriers - Nimbus Dam	Instream structures, dams, culverts, trestles	Migration Barriers - Migration delays and impediments
			Passage Problems - Barriers to passage	Migration Barriers - Folsom Dam	Management of marsh flows by structures	Migration Barriers - Migration delays and impediments (for birds - lack of flooding; for fish - salinity control barrier)
					Barriers to fish and animal movement	Migration Barriers - Migration delays (impediments)
						Migration Barriers - Impoundments (check dams)
Floodplain Changes	Levees, Bridges, and Bank Protection	Channel complexity, diversity	Flow - Impacts from flood management practices	Flood Control - Bank protection	Flood control facilities and practices	Lack of Floodplain - Bank protection
		Channel form, channelization (sinuosity)	Geomorphic Factors - Lack of channel integrity due to gravel mining	Lower levee maintenance	Levee maintenance	Lack of Floodplain - Channelization
		Lack of floodplain	Geomorphic Factors - Modifications to channel morphology	Upper channel maintenance	Diking of wetlands	Lack of Floodplain (along CCCo. shoreline due to urbanization/industrial)
		Lack of food supply	Lack of Food Supply	Inadequate Spawning Habitat - Flooded vegetation	Channel modification, straightening	Lack of Floodplain - Conversion from tidal to managed wetlands (historical)
		Nutrient loss, reduced recruitment	Degraded Instream Riverine Habitat Conditions	Inadequate Rearing Habitat - Instream cover/woody debris	Lack of channel complexity	Lack of Floodplain (Cosumnes entrenchment, historically dredged areas, encroachment)
		Riparian restoration	Lack of Shaded Riverine Aquatic (SRA) Habitat	Inadequate Rearing Habitat - Floodplain/littoral zone	Bank erosion from boats, wind, mass slides	Lack of Spawning Habitat

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Floodplain Changes, cont.		Riparian degradation	Lack of Floodplain and Riparian Woodland Habitat	Inadequate Rearing Habitat - Wetland/slough	Lack of transition vegetation	Lack of Foraging Habitat
		Riparian vegetation loss	Habitat and Land Use Impacts - Lack of riparian vegetation	Inadequate Rearing Habitat - Shaded riverine aquatic	Habitat diversity maintenance	Lack of Foraging Habitat - Lack of food supply
		Large woody debris losses (refuge habitat)			Lack of riparian cover	Geomorphic Factors - Lack of Channel Complexity
		Lack of shallow water rearing habitat				Geomorphic Factors - Gravel mining (active and historic at Mokelumne)
		Riparian vegetation encroachment				
Gravel Recruitment	Gravel Mining and Recruitment	Spawning gravel (mechanical cleaning)	Geomorphic Factors - Lack of channel integrity due to gravel mining	Inadequate Spawning Habitat - Gravel recruitment		Geomorphic Factors - Lack of sediment
		Gravel	Geomorphic Factors - Insufficient presence of gravel	Inadequate Spawning Habitat - Gravel armoring		Geomorphic Factors - Sedimentation (coarse sediments - Mokelumne and Calaveras)
		Spawning gravel quantity and quality		Inadequate Spawning Habitat - Gravel armoring Permeability		
		Gravel deficit				
		gravel and gold mining effects (changes lotic to lentic system)				
		Poor or missing spawning habitat				
		Spawning bed armoring				
		Coarse sediment management				

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Gravel Recruitment, cont.		Geomorphic reconfiguration, spawning gravel rehabilitation				
Fine Sediment		Accelerated sedimentation	Erosion/Sediment Input/Geomorphic Factors	Channel Morphology - Change in sediment supply	Sedimentation aggregation	
		Sedimentation of spawning reach	Geomorphic Factors - Impacts from accelerated erosion: roads, hillsides, banks		Contaminated sediments, Mare Is., Napa	
		Fine sediment management				
Dredging	Dredging and Sediment Disposal				Dredging disposal	Dredging (historic)
						Dredging (lack of)
						Water Quality - Dredging
Water Quality	Contaminants	Water quality (contaminant management)	Toxicity/Water Quality	Water Quality (non-temperature)	Urban & ag. runoff and non-point pollution	Water Quality - Contaminants
		Water quality	Water Quality - High temperatures		Urban point source pollution, waste plants	Water Quality (salinity, point source, non-point source)
		Water pollution (agricultural organics)	Water Quality - Problems due to forest management		Point source pollution at Mare Island	Water Quality - Contaminants (refineries)
		Water quality/pollutants	Water Quality - Herbicide use (e.g. PG&E and golf course)		Disposal of accumulated salts	Water Quality - Non-point siltation from managed wetlands
		Diseases	Water Quality - Urbanization: non-point source pollution		Water quality from Carquinez Strait	Water Quality (salinity, DO)
					Low dissolved oxygen and high temperature	Water Quality - Contaminants (Cosumnes, Mokelumne - orchard spray and grazing)

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Water Temperature		Flow management (temperature, velocity, depth)		High Water Temperature Spawning	High Water Temperature	Water Quality - Water temperature
		Water temperature		High Water Temperature Incubation		Water Quality - Water temperature (circulation/water impoundments within Suisun Marsh; dead-end sloughs)
		Water temperature (surface)		High Water Temperature Rearing		Water Quality - Water Temperature (flow related at Cosumnes, Woodbridge Dam at Mokelumne)
Introduced Species	Invasive Aquatic Plants	Introduced species			Exotic plants	Exotic Species (competition and predation)
						Exotic Species
	Invasive Riparian and Salt Marsh Plants				Exotic fauna	Exotic Species - Striped bass vs. indigenous fish species (competition and predation)
	Invasive Aquatic Organisms				Mosquito abatement	Exotic Species - Birds and Fish
	Non-Native Wildlife					Exotic Species - Plants (hydrilla, arundo, tamarisk)
Predation and Competition	Predation and Competition	Predator control	Impacts from predation	Predation		Lack of Spawning Habitat - Predation and competition
		Predation				

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Harvest of Fish and Wildlife	Harvest of Fish and Wildlife	Harvest (ocean and freshwater)	Predation - Impacts from poaching	Overharvest - Sport	Fish and animal harvest	Harvest - Fish and wildlife harvest legal (over harvest)
		Poaching (upper 30 miles)	Population Management - Inadequate fishing regulations	Overharvest - Commercial		Harvest - Fish and wildlife harvest illegal
		Illegal harvest	Fish Population Management - Inadequate fishing regulations	Overharvest - Poaching		Harvest - Fish and wildlife harvest
		Fishing regulations				Fish and Wildlife Harvest Ocean and instream (legal and illegal)
Population Management		Straying	Straying		Institutional stressors, mentoring, lack of accountability, high staff turnover	
		Migratory pathway changes	Population Management - Straying of adults into gold fields			
			Fish Population Management - Potential need for winter/spring run spawning population initiation			
Land Use			Land Use Actions		Urbanization	Conversion of Tidal Marsh Area to Managed Seasonal Wetlands - Land use conversion (historic)
			Habitat and Land Use Impacts - Lack of riparian vegetation		Change in land use intensity, ag. use	Lack of Floodplain - Land use intensification

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Land Use, cont.			Habitat and Land Use Impacts - Lack of floodplain/side channel habitat		Lack of topographic complexity in marshes	Lack of Floodplain - Land uses (grazing, conversion into vineyards, golf courses, Pierces disease control on riparian)
			Habitat and Land Use Impacts - Impacts from grazing		Grazing	
			Habitat and Land Use Impacts - Land use impacts associated with livestock		Lack of tidal wetlands	
					Draining	
					Habitat fragmentation	
Artificial Propagation of Fish	Artificial Propagation of Fish	Hatchery management (genetics)	Fish Population Management - Potential for hybridization of spring and fall run populations	Hatchery Practices - Genetic dilution	Hatchery practices, genetics issues	Hatcheries (salmonid and striped bass)
			Fish Population Management - Fish pathogens at aquaculture facilities, control is needed	Hatchery Practices - Timing selection		Hatcheries
			Fish Population Management - Excessive hatchery production on lower reach (potential straying of mainstem fish)	Hatchery Practices - Behavioral influences		
			Fish Population Management - Incidental mortality of spring run in hatchery	Hatchery Practices - Disease		

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Climate		Ocean conditions (oceanographic)				Climate Change
		Water temperature (groundwater)				
		Global warming				
Human Disturbance	Human Disturbance		Fish Population Management - Need protection for spring run holding areas		Increased Public Access	Human Disturbance - Boat wakes
						Watercraft Discharge Near Shore and Exotics
Wildfire	Wildfire			Habitat Management (i.e., fire, etc.)		

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