

Stressor Categories	Stressor Subcategories	Description of Stressors	Example Restoration Actions	Location	
Flows	Water Diversions		Convert pumps used in water exchange program from diesel to electrical power source.	Deer Creek, Mill Creek	
			Roseville Reclamation Pipeline.	American River	
	Hydrograph Alterations	Inadequate flow, flow variability, flow timing, stranding due to flow fluctuation, lack of flushing flows, lack of attraction flows, saltwater intrusion.		Conduct winter rice flooding and waterfowl pilot project to assess priority locations and flow needs.	Sacto. River Mainstem - Colusa to Delta
				Encourage reliance on reclaimed water for use in parks, golf courses, large landscaped areas, etc.	North Bay
				Consider water acquisition in the Central Valley.	North Bay
				Support water conservation education.	North Bay
				Develop a water budget for low water years.	North Bay
				Fund programs to keep needed USGS stream gages, in order to provide necessary data for water management decisions.	North Bay
				Support local water conservation organizations and water management plans.	North Bay
				Water acquisition for all life stages (AFRP).	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
				Flow enhancement study.	Tuolumne River
				Study in-stream flow needs for smolt survival.	Stanislaus River
				Assessment/Feasibility of channel maintenance flows.	Stanislaus River
				Evaluate reoperation of New Melones to mimic seasonal flow variability.	Stanislaus River
				Assess ground water management, water transfers, distribution system efficiency.	San Joaquin, Merced, Tuolumne, and Stanislaus Rivers
				Evaluate additional water exchange to ensure passage during critical migration periods.	Deer Creek, Mill Creek
				Real time flow monitoring.	Mill Creek
				Land retirement to decrease the need for water diversion.	Delta
				Extend and expand flow agreement with PG&E.	Battle Creek
				New flow standards.	American River
				Flow fluctuation criteria.	American River
	Dry year pulse flow evaluation.	American River			
	Water conservation actions.	Delta			
	Manipulation of flow timing.	Delta			

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			Water acquisition.	Delta
			Study options for operations for the Old River barrier.	Delta
			Study flows in the Yolo Bypass and San Joaquin River for potential splittail spawning.	Delta
			Study the effectiveness of pulse flows in the San Joaquin system and their relation to potential improvements in survival.	Delta
			Conduct an instream flow study, including all life stages, for possible anadromous fish use.	Calaveras River
			Evaluate feasibility of restoring anadromous fish on lower reaches.	Calaveras River
			Study and provide channel maintenance flows, including adequate coarse sediment supply, and fine sediment transport.	Mokelumne and Calaveras rivers.
			Evaluate conjunctive use possibilities for water supply.	Mokelumne River
			Provide adequate flow (> minimum) for spawning habitat and rearing.	Sacto. River Mainstem - RBDD to Chico Landing
			Reestablish channel maintenance flows.	Clear Creek
	Entrainment	Unscreened diversions, impingement.		
			Assess feasibility, prioritize, install, upgrade, and maintain fish screens.	San Joaquin (below Merced), Merced, Tuolumne, and Stanislaus rivers
			Conduct screen rehabilitation.	Sacto. River Mainstem - Keswick to RBDD and Colusa to Delta
			Install new screens.	Sacto. River Mainstem
			Conduct screen options feasibility study (consolidate diversions, construct in-gravel wells).	Sacto. River Mainstem - RBDD to Delta
			Complete fish screens and ladder at Durham-Mutual Dam.	Butte Creek
			Complete fish screen and ladder at Adams Dam.	Butte Creek
			Complete fish screen and ladder at Gorrill Dam.	Butte Creek
			Site survey and engineering analysis for remaining diversion structures along lower Butte Creek (including White Mallard fish screen and ladder, and Drumheller Slough outfall culvert reconstruction).	Butte Creek
			Purchase screened portable pumps as alternative to Little Dry Creek Diversion.	Butte Creek
			Fish screen and ladder at Eagle Canyon Diversion.	Butte Creek

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			Options and feasibility analysis for additional fish screens, ladders, and a flow allocation methodology above Eagle Canyon.	Battle Creek
			Screen unscreened diversions.	Feather River, Yuba River
			Implement the Daguerre Point Dam Project listed in the spring run chinook report (fish screen, fish ladder, and dam modifications).	Yuba River
			Fish screen improvement (Fairbairn WTP).	American River
			Address problems with unscreened diversions, especially on the Napa River.	North Bay
			Accelerate and continue funding for screening.	Suisun Marsh and Delta Eastside Tribs
			Study the biological significance of the effects of any fish entrainment into marsh.	Suisun Marsh
			Establish annuity/endowment for operation, maintenance, and improvement for existing fish screens.	Suisun Marsh and Delta Eastside Tribs
			Establish a cooperative effort to study and implement screening of diversions, including consolidation of diversions where appropriate and screen maintenance.	Delta and Delta Eastside Tribs
			Change operations and physical facilities at the State and Federal pumps to reduce entrainment.	Delta and Delta Eastside Tribs
			Evaluate possible changes and operations of other diversion facilities to reduce entrainment.	Delta and Delta Eastside Tribs
			Screen and redesign Stockton East diversion .	Calaveras River
			Rehabilitate and enlarge Woodbridge screen bypass pipe.	Mokelumne River
	Migration Barriers and Straying	Migration barriers or delays caused by physical structures, insufficient flow over shallow areas, inadequate attraction flows, adverse water quality conditions, delayed flooding of marshlands, or other factors.		
			Structure and operation of ACID.	Sacto. River Mainstem - Keswick to RBDD
			Options for passage and reduction of predation at RBDD.	Sacto. River Mainstem - RBDD to Chico Landing
			Evaluate operation of Englebright Dam and Reservoir.	Yuba River
			Replace fish ladder at Iron Canyon.	Big Chico Creek
			Install discharge bypass at One Mile Recreation Area.	Big Chico Creek
			Replace fish ladder at One Mile Pool.	Big Chico Creek
			Improve fish passage at Saelzler Dam.	Clear Creek

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			Conduct an options, feasibility, and engineering analysis of fish passage problems and habitat restoration opportunities.	Antelope Creek
			Reintroduction of steelhead above Folsom Dam.	American River
			Plan for the removal of barriers on diked bay lands which block movement of smelt.	North Bay
			Make a plan for the removal of barriers for steelhead passage. (RCD already has documents for this kind of project.)	North Bay
			Put balls on power lines to alert birds.	North Bay
			Erect wildlife passage areas on highways.	North Bay
			Operate the Delta Cross Channel gates to prevent migration delays of fish. Also consider Georgiana Slough modifications.	Delta
			Fund land retirement adjacent to temporary barriers.	Delta
			Evaluate pulse flow effects on fish migration.	Delta
			Provide dissolved oxygen, migration barrier relief through modifications at the head of Old River.	Delta
			Fund Nature Conservancy and other projects specific to barriers and diversions.	Butte Creek
			Modifications to Clough Dam.	Mill Creek
			Evaluate feasibility of removing checkdams.	Calaveras and Consumes rivers
			Evaluate habitat above Barrier Falls at Chimney Rock.	Butte Creek
Floodplain and Marshplain Changes	Hydrological isolation of floodplain or marshplain	Lack of flow over floodplains and marshplains, lack of return flow to main channel.		
			Channel and floodplain maintenance policy.	Stanislaus River
			Increase size of drains to the marsh lands along highway 37 to improve drainage.	North Bay
			Conduct Yolo Bypass feasibility of establishing floodplain-like conditions at a lower flow split between the bypass and the river.	Sacto. River Mainstem - Colusa to Delta
			Manage hydrograph to allow maximum overbank flooding within flow peak potential.	Sacto. River Mainstem - RBDD to Chico Landing
			Modify drainage from floodplain or bypass areas to reduce fish stranding.	Delta

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	Physical isolation of floodplain or marshplain	Habitat fragmentation.		
			Establish setback levees to create shallow water habitat and other priority habitat types. Consider possible adverse trade-offs between habitat types that may be created with setback levees.	Delta
			Create a flood bypass in the southern Delta along the Cosumnes River and on the lower Mokelumne River which keeps the river channel and the floodplain directly connected. Refer to the work of the Levee Technical Committee on this action.	Delta
			Consider land use changes and restoration in the Yolo Bypass.	Delta
			Increase area of flooded agricultural lands. Combine with no net loss of agricultural wetlands that provide foraging habitat for migratory birds.	Delta
			Study and implement expansion of setback levees. Mokelumne River in the vicinity of Highway 99 to the Delta.	Cosumnes, Mokelumne, and Calaveras rivers
			Study the feasibility of reconnecting the incised channel to the floodplain.	Cosumnes River
			Modify levee maintenance practices to enhance habitat.	Delta Eastside Tribs
			Refer to Habitat Goals Project regarding guidance for land acquisition.	North Bay
			Support Habitat Goals Project. Pilot studies can be included in the action list.	North Bay
			Expand San Joaquin National Wildlife Refuge on the Tuolumne and San Joaquin rivers.	Tuolumne and San Joaquin (below Merced) rivers
			San Luis National Wildlife Refuge expansion on the San Joaquin River.	San Joaquin River (above Merced)
			<i>Restore tidal wetlands</i>	Delta, North Bay
			<i>Restore Shaded Riverine Aquatic (SRA) habitat</i>	System-wide
			<i>Restore seasonal floodplain wetlands</i>	System-wide
			Encourage river corridor planning	System-wide
			Reclaim historic floodplain where feasible, within current flow context.	Sacto. River Mainstem - Keswick to Colusa

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			Restore floodplain function by moving/removing private levees.	Sacto. River Mainstem - Keswick to Chico Landing	
			Initiate land acquisition in floodplain.	Sacto. River Mainstem - RBDD to Chico Landing	
			Revise floodplain management.	Sacto. River Mainstem - RBDD to Chico Landing	
			Obtain floodplain easements.	Sacto. River Mainstem - RBDD to Chico Landing	
			Work with landowners to establish easements for seasonal wetland habitat creation and other priority habitat.	Delta	
	Elimination of fine sediment replenishment	Loss of floodplain and marshplain fine sediment deposition, decreased food production.			
	Land use changes in the floodplain or marshplain	Urbanization, agriculture, grazing.			
			Fund incentives to increase area of agricultural wetlands and foraging habitat for migratory birds.	Delta	
			Fund projects to restore tidal mudflats in shallow water habitat.	Delta	
			Fund programs to prevent the loss of tidal mudflats and shallow water habitat.	Delta	
			Encourage fish compatible project responses to flood damage.	Butte Creek	
			Create aquatic habitat that will be useful for foraging.	Delta	
Post-flood assessment.			San Joaquin, Merced, Tuolumne, and Stanislaus rivers		

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Channel Form Changes	Alteration of channel form	Loss of shallow water habitat, channel deepening, lack of floodplain, degradation of instream habitat conditions, loss of lotic conditions.		
			Channel restoration and reconfiguration projects, including gravel pit isolation projects.	Merced, Tuolumne, Stanislaus rivers
			Conduct project levee or other rock removal/relocation projects.	Sacto. River Mainstem - Chico Landing to Delta
			Evaluate feasibility of reestablishing an interaction between the river and the floodplain.	Butte Creek
			Wetland/slough complex restoration.	American River
			Acquire land on Napa and Petaluma rivers from willing private land owners.	North Bay
			Restore other land.	North Bay
			Convert land (approximately 7,000 acres) to tidal wetlands.	North Bay
			Develop plans to buy specific properties that are targets for development before they become unavailable.	North Bay
			Flood control channel improvement.	American River
	Site specific actions to restore channel form.	Butte Creek		
	<i>Restore mid-channel island habitat</i>	Delta		
	Evaluate feasibility of easements and buffer zones in the upper canyons above Hwy. 99.	Butte Creek		
	Prevention of channel meander	Channelization, loss of shallow water habitat and channel complexity, reduced gravel recruitment, riparian encroachment, bank armoring.		
			Educate public and enforce boat speed in critical areas to prevent bank erosion.	North Bay
			Apply biotechnology techniques to prevent bank erosion.	North Bay
			Establish setback levees.	North Bay
			Maintain meander belt where presently active.	Sacto. River Mainstem - Keswick to Colusa
			Allow wider meander belt where possible (by land acquisition or discontinuing levee armoring).	Sacto. River Mainstem - Keswick to Colusa
			Endorse/partner with ACOE and Rec. Bd. study on re-evaluation of floodplain protection strategy.	Sacto. River Mainstem - Colusa to Delta
Protect mainstream meander belt as a source of gravel.			Sacto. River Mainstem - Keswick to Chico Landing	
Re-establish meander zone.			Cosumnes River	

Stressor Categories	Stressor Subcategories	Description of Stressors	Example Restoration Actions	Location	
	Isolation or elimination of sidechannels and tributaries	Loss of woody debris recruitment, loss of rearing and spawning habitat, loss of refuge habitat, decreased food production.			
			Improve rearing habitat by increasing structural complexity.	Sacto. River Mainstem - Keswick to Colusa	
			"Tailrace Habitat" utilization (below Nimbus).	American River	
	Reduction of gravel recruitment	Loss of spawning habitat, increased gravel armoring.			
			Merced River Ranch - purchase dredger tailings.	Merced River	
			Spawning gravel introduction near LaGrange.	Tuolumne River	
			Goodwin Canyon gravel replenishment and monitoring.	Stanislaus River	
			Identify gravel sources for restoration.	Stanislaus River	
			Coarse sediment deficit/replenishment criteria.	Merced and Stanislaus rivers	
			Identify locations to introduce gravel.	Merced and Tuolumne rivers	
			Knights Ferry gravel replenishment and monitoring.	Stanislaus River	
			Take actions to protect gravel sources in tributaries.	Sacto. River Mainstem - Keswick to Chico Landing	
			Restore and replenish spawning gravel in North Fork.	Battle Creek	
			Replenish riverine gravels, monitor gravel movement, and schedule Keswick flow for gravel submergence and redistribution.	Sacto. River Mainstem - Keswick to RBDD	
			Restore and replace spawning gravels and habitat using natural processes (i.e., river flows) to distribute the gravel.	Mokelumne River	
Channel aggradation due to fine sediments	Accelerated erosion, changes in channel form caused by deposition of fine sediments due to increased sediment loads or decreased sediment transport capacity.				
		Gasberg Creek sediment control.	Tuolumne River		
		Pilot gravel cleaning project.	Tuolumne River		
		On-farm ag drainage treatment (pilot project).	San Joaquin and Stanislaus rivers		
		Sediment management plan for watershed (identify sources).	Merced River		
		Pilot gravel ripping study on Stanislaus.	Stanislaus River		
		Stanislaus Watershed Projects: East Stanislaus RCD.	Stanislaus River		

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			Watershed Projects: Tuolumne and Calaveras counties RCD.	Tuolumne and Stanislaus rivers
			Increase tributary sediment control.	Sacto. River Mainstem - Keswick to Chico Land.
			Resolve erosion problems.	Deer Creek, Mill Creek
			Implement road related fixes for erosion problems.	Deer Creek, Mill Creek
			Fund recommendations coming out of the local watershed groups.	Battle Creek
			Identify sources of erosion and develop projects and actions for decreasing erosion.	Battle Creek
			Evaluate flood management practices in Lindo Channel.	Big Chico Creek
			Develop a watershed plan.	Big Chico Creek
			Reestablish channel integrity.	Clear Creek
			Provide assistance to local watershed groups.	Clear Creek
			Erosion control projects.	Clear Creek
			Evaluate feasibility of off-channel and sidechannel restoration.	Yuba River
			Fund all or parts of watershed analyses.	Antelope, Cow, Cottonwood, and Little Chico creeks
			Include implementation actions in watershed analyses.	Antelope, Cow, Cottonwood, and Little Chico creeks
			Encourage consolidation of local efforts when reasonable.	Antelope, Cow, Cottonwood, and Little Chico creeks
			Support local stewardship groups.	North Bay
			Support local education on erosion control.	North Bay
			Support local land owner education efforts.	North Bay
			Conduct studies on erosion containment, transport, and flow dynamics.	North Bay
			Develop models for sediment sources.	North Bay
			Assess and monitor sediment sources and impacts.	North Bay
			Strengthen enforcement of best management practices on land development and public and private roads.	North Bay
			Fund storm water erosion enforcement.	North Bay
			Facilitate public outreach and discussion with regulators, regulatees, and resource specialists.	North Bay
			Watershed assessments.	Merced and Stanislaus rivers
			Channel maintenance flow assessment.	Stanislaus River

Stressor Categories	Stressor Subcategories	Description of Stressors	Example Restoration Actions	Location
	Loss of existing riparian zone or lack of regeneration potential	Loss of food supply, loss of Shaded Riverine Aquatic (SRA) Habitat, loss of channel complexity.		
			Assist RCDs to do outreach to land owners for riparian fencing and range land management training.	North Bay
			Fund vegetation and maintenance in riparian urban corridors.	North Bay
			Develop setbacks for every acquisition.	North Bay
			Support vineyard disease research on Pierces disease in a riparian friendly way.	North Bay
			Study the extent of the Napa riparian zone.	North Bay
			Restore vegetation and complexity to the riparian systems to help cool the water and provide protection for steelhead.	North Bay
			Purchase and restore land at Basso Bridge.	Tuolumne River
			Manage post-flood land use for riparian growth.	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
			Riparian restoration and revegetation projects.	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
			Protect, restore, and re-establish SRA where possible.	Sacto. River Mainstem - Keswick to Colusa
			Conduct feasibility study on revegetation of project levees or rocked levees.	Sacto. River Mainstem - Chico Landing to Delta
			Protect/restore riparian forest habitats.	Sacto. River Mainstem - Keswick to Chico Land.
			Instream cover (woody debris).	American River
			SRA habitat protection/management.	American River
			Restore riparian vegetation.	Deer and Mill creeks, Feather and Yuba rivers
			Reestablish and revegetate riparian areas.	Big Chico Creek
			Spawning habitat management.	American River
			Restore and add SRA habitat.	Delta Eastside Tribs
			Fund efforts to secure and restore riparian corridors.	Cosumnes and Mokelumne rivers.
			Initiate a replanting program for cottonwood, valley oak, and other large riparian species.	Delta Eastside Tribs
			Implement a landowner education program for impacts of land management activities on SRA.	Delta Eastside Tribs

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Water Quality	Increased Contaminants	Acute or chronic toxicity caused by agricultural chemicals, urban runoff, mine drainage, refineries, sewer treatment plants, and other point or non-point pollution sources.		
			Expand Real-time Water Quality Management Network	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
			Incorporate Tuolumne model with RTWQMN.	Tuolumne River
			Reduce non-point pollution - expand contaminant project work team scope (IEP review and guidance).	San Joaquin (below Merced), Merced, Tuolumne, and Stanislaus rivers
			Establish monitoring for physio/chemical/temperature contaminants, including bioassays, dairy waste, impacts on food supply and dormant pesticide dispersal.	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
			Non-point source agricultural runoff: use BMPs, expand riparian buffer zone.	Sacto. River Mainstem - RBDD to Delta
			Address agricultural chemical toxicity from Colusa Drain.	Sacto. River Mainstem - Colusa to Delta
			Develop a Highway 32 toxic spill contingency plan.	Deer Creek
			Evaluate need to fund pathogen control for private aquacultural facilities. Review status with CVPIA programs.	Battle Creek
			Establish a Delta "streamkeeper".	Delta
			Research and develop TMDL's for all non-point and point sources of pollution.	Delta
			Negotiate cooperative agreement with refineries to reduce selenium.	Suisun Marsh
			Create scientifically designed sampling program based on a scaled down RMP program.	North Bay
			Locate and inventory storm drains emptying into the Delta.	Delta
			Promote educational efforts to prevent inappropriate use of storm drains.	Delta
			Develop and fund a storm water monitoring program.	Delta
			Develop and fund water quality monitoring programs in coordination with existing USGS or other agency upstream and downstream monitoring.	Delta
Provide subsidies for alternatives to pesticides (especially Diazinon), including those used for aquatic weed control.	Delta, Suisun Marsh, and Delta Eastside Tribs			
Expand and broaden BIOS program funded under Category III.	Delta, Suisun Marsh, and Delta Eastside Tribs			

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			Identify contaminant sources and remediate them.	Delta, Suisun Marsh, and Delta Eastside Tribs
			Establish control and management program to limit Diazinon use.	Delta, Suisun Marsh, and Delta Eastside Tribs
			Implement watershed management activities to reduce sedimentation and contaminants from urban and agricultural sources.	Delta, Suisun Marsh, and Delta Eastside Tribs
			Encourage grading ordinances and enforcement by RWQCB.	Delta, Suisun Marsh, and Delta Eastside Tribs
			Increase upstream water quality monitoring (refer to Water Quality Technical Team).	Delta, Suisun Marsh, and Delta Eastside Tribs
			Implement user fees to limit contaminants.	Delta, Suisun Marsh, and Delta Eastside Tribs
			Support watershed groups in education efforts.	Delta, Suisun Marsh, and Delta Eastside Tribs
			Expand funding to identify contaminants causing toxicity.	Delta, Suisun Marsh, and Delta Eastside Tribs
			Establish a cooperative program to decrease selenium and other contaminant loads.	Delta, Suisun Marsh, and Delta Eastside Tribs
	Increased Salinity	Increased salinity due to water management, operation of diversions or structures, runoff, etc.		
			Encourage farm management actions to reduce irrigation runoff, focusing on high salinity load areas.	Delta, San Joaquin system
			Determine alternative methods for discharging salts back into bay from salt ponds.	North Bay
			Develop physical infrastructure to remove salt (if necessary).	North Bay
	Increased Nutrient or Carbon Input	Increased input of nutrients from ag runoff, wastewater treatment, and other sources. Includes low dissolved oxygen conditions.		
	Increased Mobilization of Contaminants due to Dredging	Increased turbidity, contaminant mobilization, dredge spoil disposal.		
			Assess and consider streamlined regulatory process and permit coordination on dredging to facilitate maintenance dredging.	Delta Eastside Tribs

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Water Temperature		High water temperatures due to lack of riparian shade, lack of flow, increased surface area, warm water inflow, or other factors.		
			Change water management practices in Grasslands Water District to benefit water temperatures in March and April.	Stanislaus River
			Action to ease water demand from New Melones for agricultural drainage.	Stanislaus River
			Temperature management feasibility studies, models, and operations development .	Merced and Stanislaus rivers
			Folsom Temperature Control Device (TCD).	American River
			Folsom Reservoir Cold Water Pool Management.	American River
			Thermal refugia utilization.	American River
			Pilot flow study for water temperature.	Clear Creek
			Evaluate options for addressing Colusa Drain water temperature effects on the Sacramento River.	Sacto. River Mainstem, Colusa to Delta
			Evaluate potential temperature benefits of increasing SRA habitat in the Delta.	Delta
Evaluate the effect of a water temperature control device at Englebright Dam.	Yuba River			
Undesirable Species Interactions	Introduction of new exotic species	Introduction of exotic species from ballast water, inadvertent release of exotic species, intentional introduction of species for other reasons.		
			Conduct public education and enforcement on introduction of exotic fish and plants to the aquatic habitat.	North Bay
			Implement a program to prevent introduction of exotic species into areas that are currently supporting native species.	Delta, Suisun Marsh
			Establish education programs regarding existing exotic species problems and the need to prevent deter future exotic species introductions.	Delta, Suisun Marsh
			Provide additional resources to increase the enforcement of ballast discharge regulations in areas where introduction of exotic species is a risk.	Delta
			Establish exotic species control programs in tidal and seasonal wetlands.	Suisun Marsh

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	Elevated predation/competition losses	Striped bass predation, other introduced predatory species, competition for nest sites by introduced bird species, competition for food resources by introduced fish or mollusk species, etc.		
			Physical removal of predators from gravel pits, including an assessment of impacts on salmon production.	Merced, Tuolumne, and Stanislaus rivers
			Evaluate the magnitude of predation problems and potential restoration actions to decrease predation in areas with unnaturally high predation mortality.	Sacto. River Mainstem - RBDD to Delta
			Provide additional zebra mussel control (refer to the California Task Force for zebra mussel control).	Delta
			Fund studies to better understand the biology of exotic species in order to support control or eradication efforts.	Delta
			Fund additional study of the effects of striped bass on salmonid species.	Delta
			Form a group of cooperating entities into an exotic species "SWAT" team who can target individual species for control efforts over a broad geographical area.	Delta and Suisun Marsh
			Study the effects of inland silverside predation on delta smelt.	Delta
			Prioritize and implement programs for Asian clams, Chinese mitten crabs, and all other exotic species.	Suisun Marsh
			Establish control program for inlands silversides and yellow perch (see similar Delta actions).	Suisun Marsh
			Fund control programs.	North Bay
			Conduct research to determine effects, distribution, and best control methods.	North Bay
			Fund pilot exotic species eradication programs.	North Bay
			Community education and manuals to help homeowners to identify and remove exotic species.	North Bay
			Develop strategy for red fox.	North Bay
			Establish a trapping program for brown headed cowbirds and starlings which compete with native species in riparian areas.	Delta

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	Competition from introduced plants	Invasive aquatic plants such as Hydrilla, invasive riparian zone plants such as Arundo, invasive salt marsh plants.		
			Remove non-native plants from the riparian zone, re-establish natives.	Sacto. River Mainstem
			Implement projects to reclaim priority habitats from exotic plant species.	Delta
			Education program to encourage native plant use in landscaping.	Delta, Suisun Marsh, and Delta Eastside Tribs
Adverse Fish and Wildlife Harvest Impacts		Ocean and freshwater overharvest, poaching, inadequate fishing regulations,		
			Increase number of wardens.	San Joaquin (below Merced), Merced, Tuolumne, and Stanislaus rivers
			Modify angling regulations.	San Joaquin (below Merced), Merced, Tuolumne, and Stanislaus rivers
			Evaluate biological effectiveness of expanding fisheries law enforcement.	San Joaquin (below Merced), Merced, Tuolumne, and Stanislaus rivers
			Implement a programmatic level increase in law enforcement to reduce poaching.	Deer and Mill creeks, Feather and Yuba rivers
			Focus law enforcement efforts on the creek during critical times for salmon.	Big Chico Creek
			Develop feasible, cost-effective techniques to decrease effects of ocean harvest on wild stocks.	System wide
			Estimate rate of repeat hookings, in order to better estimate hooking mortality effects at the population level for salmon subject to harvest management.	System wide
			Estimate ocean distribution of spring-run to assist with ocean harvest management.	Delta and Sacramento River system
			Evaluate cost effective mass marking techniques	System wide
			Evaluate and/or revise angling regulations.	American River

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Population Management		Migratory pathway changes, inadequate reproductive capacity due to small or non-existent spawning populations.		
			Eliminate inappropriate attraction flow.	Sacto. River Mainstem - Keswick to Chick Landing
			Evaluate need to establish founding population of spring run.	Battle Creek
			Provide input to genetic monitoring of the fish population.	Big Chico Creek
			Evaluate need for founding population of spring run chinook.	Clear Creek
			Evaluate potential for creating more separation of fall and spring-run spawning habitat to reduce or eliminate hybridization.	Yuba River
			Adult salmon counting structures.	San Joaquin (below Merced), Merced, Tuolumne, Stanislaus
			Improving Stanislaus River escapement monitoring: feasibility of using hydroacoustics.	Stanislaus River
			Fall run salmon otolith and scale evaluation	Merced, Tuolumne, and Stanislaus rivers
			Scale analysis for racial and age composition of chinook.	San Joaquin (below Merced), Merced, Tuolumne, and Stanislaus rivers
			Smolt mortality study.	Stanislaus River
			Verification and calibration of screw-trap estimates of Stan. River outmigrants: Feasibility of using hydroacoustics for smolt survival.	Stanislaus River
			Develop techniques and equipment to sample outmigrants at high flows.	System wide
Evaluate relative survival rates for smolts and fry during outmigration.	System wide			
Purchase Hills Ferry Barrier land to ensure access and reduce straying.	San Joaquin, Merced, Tuolumne, and Stanislaus rivers			

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Land Use	Grazing	Loss of riparian habitat, increased erosion, decreased water quality.				
			Gravel mining	Decreased gravel recruitment, increased fine sediments, channel instability,		
					Urbanization	Urbanization of the watershed that leads to loss of riparian habitat, habitat fragmentation, wetland drainage, and other impacts.
	Educate local governments on the value of natural habitat and improved planning to protect these areas. Help local governments develop appropriate tools for protecting important habitat areas.	System-wide				
	Plug into the local master planning process.	System-wide				
	Model planned buildout based on master planning at UC Berkeley Urban Planning Institute.	North Bay				
	Acquire wetlands so that there is no more building on them.	North Bay				
	Help city councils to limit growth in critical habitats.	System-wide				
	Identify way to preserve land with less than fee acquisition.	System-wide				
	Present riparian core areas as amenities and educate developers to their value.	System-wide				
	Identify Off-site Mitigation.	American River				
	Mitigation/Enhancement Monitoring Plan.	American River				
	Consultation/Technical Assistance.	American River				
	Identify lands that have a high potential for mass landslide potential and take early action to prevent erosion.	North Bay				
	Acquire floodplain easements.	North Bay				
	Forestry and agricultural practices	Forestry and agricultural practices in the watershed that lead to conversion of floodplain to ag use, subsidence, increased erosion, loss of habitat complexity, and water quality degradation.				
			Encourage USFS, CDF, and BLM to be part of the overall CALFED effort on a programmatic level.	Deer and Mill creeks		
			Improve agency and public education on forestry issues on a programmatic level.	Deer and Mill creeks		
			Coordinate forestry agency management plans with other agencies and conservancies.	Deer and Mill creeks		
Fund local conservancy or other planning efforts to develop watershed plans to improve watershed health.			Deer, Mill, Butte Creeks			
Encourage continued outreach activities with agricultural interest.			Butte Creek			

Stressor Categories	Stressor Subcategories	Description of Stressors	Example Restoration Actions	Location
			Fund watershed plan and conservation easements.	Butte Creek
			Encourage coordination between local groups, Park Service, BLM, and USFS.	Clear Creek
			Acquire buffer zones.	North Bay
			Public education on Best Management Practices (BMP) approach to development.	System-wide
			Support local efforts for sustainable agriculture.	North Bay
			Match funding for private landowner actions (for example, "Partners for Wildlife").	North Bay
			Establish buffer areas.	North Bay
			Demonstration farm sites.	North Bay
			GIS database of habitat and fluvial elements for Stanislaus.	Stanislaus River
			Prioritize areas for use of dredge material or other mechanisms on subsided islands (refer to the work of the Levee Technical Committee).	Delta
			Fund a cooperative effort with landowners to restore areas adjacent to Suisun Bay entrapment zone to tidal action. This action would address subsidence issues.	Suisun Marsh
			Analyze potential changes in the maintenance of Suisun Marsh to provide habitat for fish species. The project would also address land subsidence issues. This would be a cooperative pilot project with a monitoring component.	Suisun Marsh
Artificial Propagation of Fish		Genetic changes due to hatchery management, hybridization, altered timing of runs, effects of smolt releases on wild populations, introduction of pathogens, incidental spring run mortality, increased striped bass populations, and other factors.		
			Interim artificial propagation program.	San Joaquin (below Merced), Merced, Tuolumne, and Stanislaus rivers
			Hatchery fish marking program.	Merced River
			Develop a hatchery strategy for the SJR.	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
			Review and revise operation plan for Merced River Fish Facility.	Merced River
			Tuolumne River Hatchery Plan.	Tuolumne River

Stressor Categories	Stressor Subcategories	Description of Stressors	Example Restoration Actions	Location
			Hatchery operation modification.	Sacto. River Mainstem - Keswick to Chico Landing
			Evaluate options to provide an isolated water supply for Coleman National Fish Hatchery.	Battle Creek
			Evaluate Battle Creek plan (AFRP).	Battle Creek
			Evaluate hatchery practices at Feather River Hatchery.	Feather River
			Hatchery management practices.	American River
			Increase artificial production.	American River
Climate		Global warming and ocean conditions.		
Human Disturbance		Direct disturbance of fish and wildlife populations by anglers, boaters, and other recreational users.		
			Tuolumne River Environmental Education Center.	Tuolumne River
			Tuolumne River Interpretive Center Conceptual Plan.	Tuolumne River
			Resources education program.	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
			Public and angler education programs.	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
			Information sharing network for the San Joaquin watershed.	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
Wildfire		Habitat management through use of fire; increased frequency of fire near urban areas.		
			Fire management.	American River