JOINT CALFED/SJRMP
SAN JOAQUIN RIVER FISHERY
TECHNICAL TEAM WORKSHOP REPORT

Prepared for

CALFED Bay-Delta Program
Ecosystem Roundtable
and
San Joaquin River Management Program

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This workshop report is a compilation of information from all the participants in the January 15–16, 1997 workshop. It includes comments from numerous agencies and individuals on the preliminary draft document circulated earlier. The CALFED Bay-Delta Program and San Joaquin River Management Program staff appreciate the input of both the workshop participants and the individuals who commented on the earlier draft document.

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1. INTRODUCTION

The CALFED Bay-Delta Program was established in May 1995 as a cooperative effort among seven state and federal agencies with management and regulatory responsibilities in the Bay-Delta. The program is aimed at developing a long-term solution to problems affecting the San Francisco Bay/Sacramento-San Joaquin Delta estuary in Northern California, with a focus on improving ecosystem quality, water quality, and water supply reliability, and reducing system vulnerability. As part of CALFED, the Ecosystem Roundtable was formed as a stakeholder group to provide guidance regarding implementation of ecosystem restoration projects in the next 3-to-5 years. CALFED is soliciting input from technical experts in a variety of disciplines and geographical areas to aid in identifying and prioritizing restoration projects.

The San Joaquin River Management Program (SJRMP) was established through legislation (AB 3603) to identify actions which can be taken regarding the San Joaquin River to benefit all legitimate uses of the system. The program objective is to develop comprehensive and compatible solutions to water supply, water quality, flood protection, fisheries, wildlife habitat and recreation needs. Further legislation (AB 3048) extended the program 5 years and directed it to seek implementation of the many projects, acquisitions, and evaluations defined during the initial planning phase.

1.1 WORKSHOP OBJECTIVES

On January 15 and 16, 1997, the CALFED Bay-Delta Program and SJRMP jointly conducted a workshop at Bass Lake Resort, east of Merced. The workshop objectives were to:

- Briefly review historical habitat and salmon population conditions in the San Joaquin River system.
- Review existing studies, projects, and management plans, including goals and objectives for restoration.
- Identify and prioritize problem areas and stressors.
- Identify potential solutions for reducing stressors and improving fish resources and ecosystem processes.
- Develop a package of priority fisheries restoration projects, actions leading to projects, and monitoring efforts to be implemented over the next 3-to-5 years.

- Provide the package of restoration projects to CALFED and the Ecosystem Roundtable for inclusion in the workplan being developed to guide funding decisions during the next funding cycle.

1.2 WORKSHOP APPROACH

A copy of the workshop agenda and attendee list is provided in Appendix A. The workshop consisted of selected background presentations, general session discussions, and geographic subgroup discussions. The background presentations included an example, using the Merced River, to illustrate the history of human intervention in the San Joaquin River basin by Jennifer Vick (Appendix B), and a presentation on the status, patterns, and general factors influencing San Joaquin fall run chinook salmon escapements by Bill Loudermilk (Appendix C). General session discussions included comments from David Bernard on ecosystem restoration (Appendix D), and information from Paula Landis on SJRMP studies, projects, and funding sources (Appendix E).

Partway through the workshop, the participants were divided into two subgroups. The first group identified system stressors and potential restoration projects in the Stanislaus River and San Joaquin River (SJR) downstream of its confluence with the Stanislaus River. The second group did the same for the Tuolumne and Merced rivers, and San Joaquin River upstream of the Stanislaus River confluence. A map of the geographical area addressed by the participants is provided in Figure 1. The entire group then reconvened to discuss their subgroup results, combine their findings to the extent feasible, and jointly prioritize various types of restoration actions and/or specific projects.

1.3 GENERAL SESSION COMMENTS

The first general session began with a review of workshop goals and objectives, and associated discussion. It was noted that the technical results of the workshop have multiple clients, including SJRMP, CALFED, the Central Valley Project Improvement Act (CVPIA) program, the Four Pumps program, and individual non-project districts and agencies. In addition, there are multiple funding sources and cost sharing arrangements that may benefit from this information over the next several years. The focus of the workshop was on aquatic resources, particularly restoring anadromous fish (fall run chinook salmon), because of their reliance on the Delta and associated CALFED concerns.

Following the presentations by Jennifer Vick, Bill Loudermilk, and Paula Landis, Cindy Darling reviewed the status of CALFED funding. The Category III component of Proposition 204 (up to $60 million) and additional stakeholder contributions to Category III are the first component of

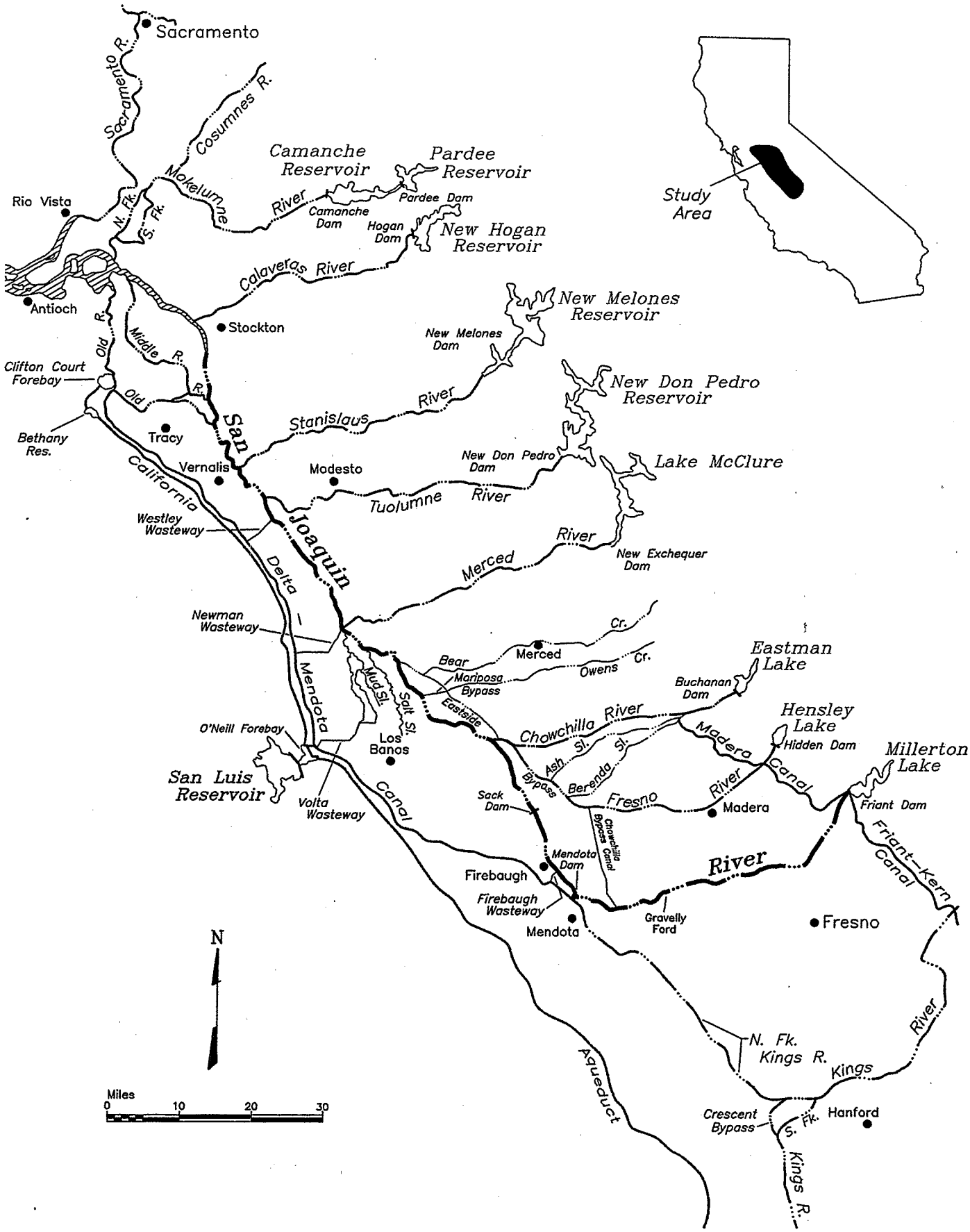


Figure 1. San Joaquin River System

E-028880

the currently available restoration funds that will be allocated to selected projects. In addition, there are the CVPIA Restoration Fund and state CVPIA matching funds, and potential federal matching funds to Proposition 204 monies. The variety of other potential funding sources was also emphasized. Although funding priorities among the various sources differ, it is likely that common interests will occur on many projects. Cindy concluded by noting that the technical teams are being asked to identify the actions that need to be taken to improve habitat and fish production from a technical viewpoint. Input from all the technical teams will be integrated into a workplan for consideration by the Ecosystem Roundtable and CALFED.

The afternoon session began with a discussion of targets for production of fall run chinook (see Section 2). David Bernard reviewed the process for considering restoration actions, identifying indicators, and setting boundaries for space and time constraints (see Appendix D). Subsequent discussion led to concurrence that the space boundary for the workshop would be the San Joaquin River system downstream to the head of Old River. A Delta area technical team will address restoration projects on the San Joaquin River downstream of that point. Although the entire San Joaquin River was generally discussed, the primary focus would be on the section downstream of the Merced River confluence. The time period focus would be projects and programs that should be initiated over the next 3-to-5 years.

The rest of the afternoon and following day were spent in the breakout subgroups and/or in a combined general session that addressed stressors in the fall run chinook salmon life cycle, potential projects and programs that would address these stressors, and priorities for restoration.

2. RESTORATION GOALS

Broad goals for ecosystem restoration in the San Joaquin basin include re-establishment of both biological and physical ecosystem functions, population recovery for key species, and maintenance of beneficial uses of the chinook salmon fishery resources. Specific numerical restoration goals for chinook salmon in the San Joaquin River system were compiled from the CVPIA draft Anadromous Fish Restoration Program (AFRP), and the Delta Native Fishes Recovery Plan. Although restoration goals are also published in the Department of Fish and Game's Central Valley Salmon and Steelhead Restoration and Enhancement Plan (1990), they were not used during the workshop. The AFRP and Recovery Plan goals are as follows.

2.1 ANADROMOUS FISH RESTORATION PROGRAM

The goal of the AFRP, as stated in Section 3406(b)(1) of the CVPIA, is to "develop within three years of enactment and implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967–1991 (...this goal shall not apply to the San Joaquin River between Friant Dam and the Mondota Pool.)." Production targets for the AFRP are arithmetic means that represent a combination of escapement and harvest. Targets for each of the San Joaquin tributaries are:

Stanislaus River	≥22,000
Tuolumne River	≥38,000
Merced River	≥18,000
Total	≥78,000

Assuming a 75 percent harvest rate in the ocean, these production targets translate to an escapement of approximately 20,000 fish returning to spawn in the San Joaquin system. Current escapement is approximately 4,000 fish, so this production target represents a five-fold increase. Escapement records presented by Bill Loudermilk earlier in the workshop (Appendix C) show that this target is within historical levels that maintained a level of beneficial uses.

2.2 DELTA NATIVE FISHES RECOVERY PLAN

The Delta Native Fishes Recovery Plan goal is for naturally spawned fish, and includes criteria for average and minimum escapement over a 15-year period. The criteria are:

1. Median escapement of 20,000 fall run chinook over 15 years, with at least 3 years classified as dry or critically dry, and

2. A 3-year running average, over 15 years, of greater than or equal to 3,000 fish with at least 3 years classified as dry or critically dry.

3. Smolt survival numbers must approach pre-project levels when adult numbers decline to less than 3,000 naturally spawning fish.

It should be noted that goals from each of these sources are roughly equivalent, having a mean or median of approximately 20,000 fish. Although the five-fold increase (4,000 to 20,000 fish) was considered feasible over the long term by the workshop attendees, all the steps needed to achieve the goal were not certain. There was some concern that a numeric fish population goal is not sufficiently representative of ecosystem process, although it may be one of several good indicators. Some participants expressed that there may be too much "noise" in the fish population fluctuations to use them as an indicator of healthy ecosystem process and function, while others argued that fish population numbers were one of the best indicators of ecosystem health.

3. ECOLOGICAL STRESSORS

3.1 FALL RUN SALMON LIFE CYCLE

Each of the two subgroups developed independent schematics displaying the interrelationship of various stressors on different portions of the fall run chinook salmon life cycle within their respective geographic areas. Both subgroups divided the life cycle into segments representing some combination of fry, smolts, adults, and spawning. Somewhat different terminology was used by the two groups to identify stressors.

The subgroup for the Tuolumne River, Merced River, and San Joaquin River upstream of the Tuolumne River developed three schematic diagrams that displayed stressors and their interrelationships that affect spawning success and adult mortality, egg mortality, and fry to smolt growth or mortality (Appendix F, Figures F1–F3). The diagrams were then used to tabulate individual stressors, which were subsequently grouped into major stressor categories.

The subgroup for the Stanislaus River and the lower San Joaquin River developed four schematic diagrams that displayed stressors on the spawning habitat, fry and juveniles to yearling age, migrating smolts, and smolts and adults from smolt outmigration to adult spawning (Appendix F, Figures F4–F7). They then identified the stressors considered most important for each life stage from the diagrams. The high priority stressors for all life stages were considered together and voted on to indicate overall priority. Stressors outside the geographic boundary of the workshop were noted to be considered in another forum.

3.2 STRESSORS

Tuolumne, Merced, and Upper San Joaquin Rivers

Individual stressors identified by the subgroup for the Tuolumne River, Merced River, and upper San Joaquin River (above the Tuolumne confluence) are listed in Appendix G, along with the affected life stage. These stressors were grouped into similar categories (Table 1) that could be considered during ranking of potential restoration projects.

Stanislaus and Lower San Joaquin Rivers

The Stanislaus and lower San Joaquin rivers subgroup took a different approach than the first group, and prioritized stressor categories prior to identifying potential projects. The most important stressor categories defined by the group are listed and prioritized in Table 2. Other

stressors identified by the subgroup but considered less important or adequately covered by the major stressors are found on the schematics for each of the life stages (Appendix F, Figures F4–F7).

TABLE 1. MAJOR RESTORATION CATEGORIES FOR STRESSORS ON FALL RUN CHINOOK SALMON IN THE TUOLUMNE, MERCED, AND UPPER SAN JOAQUIN (MERCED CONFLUENCE TO STANISLAUS CONFLUENCE) RIVERS.

Restoration Category	Life Stage			Basin		
	Adult	Egg	Fry and Smolt	Tuolumne	Merced	San Joaquin
Downstream flows	✓	✓	✓	✓	✓	✓
Geomorphic reconfiguration, spawning gravel rehabilitation	✓			✓	✓	
Illegal harvest	✓		✓	✓	✓	✓
Straying	✓			✓	✓	✓
Riparian restoration	✓		✓	✓	✓	✓
Spawning redistribution	✓			✓	✓	
Fine sediment management		✓	✓	✓	✓	
Coarse sediment management		✓		✓	✓	
Spawning gravel (mechanical cleaning)		✓		✓	✓	
Flow management (temperature, velocity, depth)		✓		✓	✓	
Water quality (contaminent management)		✓		✓	✓	✓
Predator control			✓	✓	✓	✓
Fish screens			✓	✓	✓	✓
Water quality			✓	✓	✓	✓
Hatchery management			✓		✓	✓

TABLE 2. MOST IMPORTANT STRESSOR CATEGORIES FOR FALL RUN CHINOOK SALMON IN THE STANISLAUS RIVER AND LOWER SAN JOAQUIN RIVER (BELOW STANISLAUS RIVER CONFLUENCE).

Stressor Category	Priority votes[1]	Life Stage			
		Adult	Spawners	Fry & Juvenile	Smolts
Harvest (ocean and freshwater)	0	✓			✓
Migration delays (dissolved oxygen barriers, delta barriers, lack of attraction flows)	2	✓			
Poaching (upper 30 miles)	2	✓			
Ocean conditions	0	✓			
Gravel	6		✓		
Water temperature	6, 2, 8		✓(6)	✓(2)	✓(8)
Flow regime	4, 6		✓(4)		✓(6)
Sedimentation of spawning reach	6		✓		
Predation	0, 5			✓(0)	✓(5)
Channel complexity, diversity	8			✓	
Entrainment	1				✓
Water quality/pollutants	4				✓

1. Priority votes were assigned by life stage. Where multiple life stages are affected by the stressor, votes are shown for each life stage in order.

In addition to individual stressors, it was noted that there is an 'accumulated stress' that can develop from the combined effects of several stressors. Although each stressor may, by itself, not be lethal, the combined effects can have a significant adverse effect.

Subsequent to the technical team workshop, CALFED staff reviewed the stressors identified in Tables 1 and 2 and combined them into major categories for purposes of discussion in sections 3.2.1 to 3.2.9. A rationale for inclusion of each of the major ecological stressor categories as a focus of near-term restoration actions is presented below (in no particular order of importance). The stressor categories are not of equal importance in all of the watersheds, since environmental conditions, existing restoration efforts, flow regimes, facilities, and other factors vary from watershed to watershed.

3.2.1 Entrainment

Entrainment of salmon fry and smolts in various diversions within the SJR system and in the Delta can be a significant source of direct mortality, although altering the timing, duration, and magnitude of water diversion can significantly decrease the salmon losses. Screening of diversions is a near-term, documented restoration action that can further reduce entrainment and contribute to increased production of salmon from the SJR basin.

3.2.2 Predation and Illegal Harvest

Predation is a natural mortality factor that may have an unnaturally significant effect on the salmon population when it is intensified by introduced species, habitat changes that favor the predator, or other changes that increase the vulnerability of the prey. Within the SJR system, substantial predation losses have been reported in the in-channel gravel pits that provide predator habitat and result in increased exposure of salmon fry and smolts to predation mortality. Streamflow and temperature affect predator success in the gravel pits, resulting in different levels of impact on salmon.

Long-term control of predation losses in the gravel pits is best accomplished through geomorphic (i.e., channel configuration change) projects that reduce, isolate, or eliminate these in-channel pits. Short-term, interim predator control or evaluation efforts may contribute to increased salmon survival and a better understanding of potentially significant stressors in the system.

Illegal harvest is another direct mortality factor that can adversely affect salmon production. Poaching of migrating adult salmon after they have entered the tributaries can be particularly detrimental, since most of these fish would have successfully spawned and contributed to greater smolt production.

3.2.3 Geomorphic Process and Related Fine Sediment and Gravel Issues

Alteration of the natural geomorphic processes in channels of the San Joaquin River tributaries was repeatedly cited as a major ecological stressor for the entire ecosystem (including fall run chinook salmon). Construction of upstream dams has cut off the supply of gravel to downstream areas, drastically altered the sediment budget, and changed the frequency and magnitude of channel forming flows. These changes have altered the ecosystem through decreased regeneration of riparian vegetation, degradation of spawning habitat, and other factors.

In-channel or near-channel gravel mining has altered the gravel supply, and caused channel configuration changes that result in effects on spawning and rearing habitat, predation, water temperature, migration, and other factors which affect fall run chinook salmon. Changes in land use patterns (mining, agriculture, grazing, etc.) have led to increased fine sediment deposition, decreased riparian zone area, and reduced channel stability.

Restoration of a more natural geomorphic process or function is considered important because it will: (1) begin to address fundamental causes of habitat degradation rather than simply deal with the effects, (2) provide benefits for a wide variety of species and life stages, and (3) be potentially long lasting and low maintenance.

3.2.4 Spawning Gravel Quantity and Quality

Spawning area in the SJR tributaries and mainstem has been significantly decreased due to dam construction that prevents access to upstream areas and limits gravel recruitment, mining that reduces the quantity of gravel, and floodplain encroachment that alters gravel supply. In addition, the quality of spawning gravel has decreased due to increased fine sediment deposition (which inhibits egg incubation and fry emergence), increased armoring related to flow changes (which inhibits redd construction), and altered sediment budgets (which affect gravel recruitment).

Projects that restore quantity and/or quality of spawning gravels improve a key component of the salmon life cycle that may affect salmon populations in the San Joaquin system. Well designed gravel replenishment or restoration projects may also help restore fundamental geomorphic processes that benefit other species through changes in invertebrate productivity and riparian zone dynamics related to a restored sediment budget.

3.2.5 Water Quality

The effect of degraded water quality on fall run salmon is a poorly understood systemic stressor

in the San Joaquin River basin that may have a negative cumulative effect on salmon production. Younger life stages of salmon are particular vulnerable to toxic chemicals that may originate from agricultural or urban runoff. The potential effect of contaminants, particularly in the tributaries, is not extensively researched and could be a significant indirect mortality factor.

The success of a variety of restoration projects could be limited if underlying water quality problems are not identified and addressed. Monitoring of water quality and assessment of its potential effect on salmon populations is a necessary component of an overall restoration strategy, and an adaptive management tool that can help target future restoration actions.

3.2.6 Flow Management

Due to the regulated nature of all of the major SJR tributaries in combination with Delta operation, flow regimes (magnitude, duration, and timing of flow) have a potentially significant effect on all life stages of fall run chinook salmon. Instream flows affect aquatic habitat quantity and quality through changes in depth, velocity, wetted area, water quality, sediment transport, and other factors. Similar to the water temperature stressor, flow regimes can have a cumulative effect on mortality of multiple life stages, and flow regime improvements therefore offer the potential for multiple life stage benefits.

Restoration actions which improve flow regimes for fall run chinook salmon potentially benefit other fish species, and may beneficially affect water quality. Since other restoration actions for fall run chinook salmon can be rendered relatively ineffective without sufficient flow at the proper time of year, flow regime management is a relatively critical stressor category to address. For example, floodplain restoration to enhance rearing habitat will be ineffective if flows decrease during the rearing period and cause stranding. In addition to low flow issues, periodic high flows are an important part of flow regime management, since they are responsible for creating and maintaining habitats within the ecosystem.

3.2.7 Hatchery Management

Hatchery production of salmon smolts can have a beneficial effect on overall salmon production in the system, particularly if existing habitat is inadequately "seeded" or if drought conditions coupled with downstream impacts continue to cause dramatic declines in wild salmon populations. However, hatchery management practices may also have a deleterious effect on wild salmon fry, smolts, and spawners in the San Joaquin River system. Release of large numbers of smolts into the river could affect the migratory behavior of wild fry and smolts, and may affect food supply in localized areas. The genetic integrity of the wild salmon population can be adversely affected and result in decreased fitness, changes in run timing, loss of

adaptability to changing environmental conditions, and lower reproductive success.

The role of hatcheries in the San Joaquin River system is a topic of considerable debate among technical experts, and there was no consensus at the Bass Lake workshop about this question. The Department of Fish and Game is continuing to evaluate potential genetic effects of the proposed Tuolumne River Hatchery to answer some of these important questions. In addition, the CALFED Bay-Delta long-term program is evaluating downstream actions, including changes in water operations and conveyance in the Delta, which could modify the magnitude of their impact on San Joaquin salmon outmigrants.

3.2.8 Water Temperature

High water temperature is a major stressor in the SJR system that potentially affects all life stages of fall run chinook salmon. The particularly significant influence of high water temperature during the egg, fry, and smolt lifestages results in a cumulative mortality effect that could substantially reduce the number of outmigrants. Water temperature control would have positive effects on multiple life stages, and its benefits would thereby be "compounded" through the life cycle.

Projects which provide water temperature control could be multifaceted, providing benefits to numerous aquatic species as well as enhancements to water quality and terrestrial habitat, depending on the type of action. For example, restored riparian zones (which increase shade) could provide improved terrestrial habitat and better buffers for water quality control. Changes in flow and reservoir management could result in improved salmon survival during critical time periods, due to lower temperatures and lower predation rates.

3.2.9 Riparian Degradation

Salmon are dependent on riparian zones for shaded riverine aquatic habitat that provides cover, rearing area, water temperature moderation, nutrient input, and food supply, among other benefits. Degradation or loss or riparian areas can result in grater mortality of both juveniles and adults due to increased poaching and predation, and decreased rearing and habitat quality.

Riparian areas in the SJR system have suffered significant degradation due to land use changes and other factors. Restoration of these areas could provide significant benefits for chinook salmon, other sensitive species that rely on riparian areas, and water quality.

4. EXAMPLE RESTORATION PROJECTS, PROGRAMS, AND RANKINGS

Existing, proposed, or new projects and programs for the San Joaquin River system were linked to one of the major stressor/restoration categories identified earlier in the process and are listed in Table 3. Projects that apply to multiple categories are listed only once. The workshop facilitator quickly polled the entire group of workshop participants to rank each project as having high, moderate, or low importance. Individual dissenting views or a general lack of consensus resulted in the project not receiving a rank. The ranking of projects supplemented the Stanislaus/lower San Joaquin River subgroup's prioritization (Table 2) of stressor groups (i.e., there was overlapping prioritization of stressor/restoration categories and ranking of projects). Project examples that were submitted by participants after the workshop and therefore not discussed at the workshop are listed with an asterisk in each Table 3 section. These projects are included as informational items and do not represent any recommendation by the technical team.

Brief project descriptions for many of the highest ranked projects already exist, and are included in Appendix H.

Project priorities for individual watersheds within the San Joaquin River system were solicited from stakeholders at a technical team followup meeting on March 3, 1997. Priorities received from the Tuolumne River Stakeholders are included as Appendix I.

TABLE 3. DRAFT PROJECT LIST, CALFED/SAN JOAQUIN RIVER MANAGEMENT PROGRAM JOINT TECHNICAL TEAM WORKSHOP, BASS LAKE, JANUARY 1997.

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
ENTRAINMENT *Fish screening actions can help increase the number of outmigrants by reducing entrainment of juvenile salmon. Examples of potential fish screen related actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Screen El Solyo and West Stanislaus riparian diversions near Hwy. 132	29	H	P	DFG				X		1	150
Banta-Carbona fish screen, including maintenance	26	H	P	DFG et al.				X		1	4,000
Small diversion fish screen replacement and maintenance project	33	M	P	DFG	X	X	X	X		3	500
Feasibility study for upgrading and screening five gravity feed diversions in spawning reach of Merced River	4	M	S	DFG et al.	X					2	150
Small diversion screening program - identify and prioritize sites, including maintenance		H	S	DFG et al.	X	X	X	X		1	100
Patterson fish screen feasibility study	27	H	S	DFG				X		2	100
San Joaquin Basin fish screen prioritization	56*	na	S	DFG et al.	X	X	X	X		1	110

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
ILLEGAL HARVEST *Reducing the amount of illegal harvest can have direct benefits on spawner survival. Potential actions include increased law enforcement and modified angling regulations. Examples of potential illegal harvest related actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Increase number of wardens		L	P	DFG	X	X	X	X			
Modify angling regulations		L	P	DFG	X	X	X	X			
Evaluate biological effectiveness of expanding fisheries law enforcement	54*	na	S	SJRTA	X	X	X	X		2	73
PREDATION *Predator control actions can be taken to increase survival of juvenile salmonids during outmigration until more permanent solutions are developed to counteract human induced changes in the system that favor predators. Examples of potential predator control related actions include the following.*											
Physical removal of predators from gravel pits, including an assessment of impacts on salmon production.		M	P		X	X	X				

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
GEOMORPHIC RECONFIGURATION AND INCREASED CHANNEL COMPLEXITY (Projects) *Geomorphic projects are generally aimed at restoring natural physical processes within the constraints of a managed system. Projects may include streambed alterations, substrate changes, and floodplain manipulations. Examples of potential geomorphic reconfiguration related actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Graupner Channel Restoration Project	20	H	P	DFG, DWR			X			2	250
Oakdale Recreation Area channel restoration and monitoring	22, 51*	H	P	DFG			X			3	4,000 +370
Ratzlaff Ranch (includes coarse sediment component)	1	H	P	DFG, DWR et al.	X					2	4,000
Robinson Ranch (includes coarse sediment component)	2	H	P	DFG, DWR et al.	X					3	2,000
Gallo Ranch (includes coarse sediment component)	3	H	P	DFG	X					3	200
Reed Channel Restoration Project	10	H	P	DWR, DFG et al.		X				1	490
Special run-pool 9-10	11	H	P	M/TID, et al.		X				1	4,000
Special run-pool 5-6	12	H	P	M/TID		X				2	4,000
M.J. Ruddy floodplain restoration	16	H	P	M/TID, DFG		X				2	1,500
Willms Channel restoration project and monitoring	19, 52*	H	P	DFG, DWR et al.			X			1 + 3	1,600 +330
Floodway and levee reconstruction near Waterford	53*	na	P	TRTAC et al.		X				3	TBD

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
GEOMORPHIC RECONFIGURATION AND INCREASED CHANNEL COMPLEXITY (Studies) *Additional investigation is necessary prior to implementing some types of geomorphic actions. Feasibility studies and watershed assessments are examples of potential studies, as are assessments of flood related opportunities.. Examples of potential geomorphic reconfiguration studies include the following.*											
Post-flood assessment		H	S		X	X	X	X	X	1	
Channel restoration feasibility study, Merced River Crocker-Huffman to Cressey	5	H	S	DFG et al.	X					1	300
Merced River watershed assessment	9	H	S	SJRMP	X					2	250
Stanislaus watershed assessment	25	H	S	SJRMP			X			2	250
Channel maintenance flow assessment			S				X				
GEOMORPHIC PROCESS: FINE SEDIMENT MANAGEMENT *Fine sediment management actions include efforts to decrease sediment input and mechanically remove existing sediment. Examples of potential fine sediment management related actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Gasberg Creek sediment control	18/36	H	P	M/TID, DFG, TRTAC		X				2	50
Pilot gravel cleaning project	14	M	P	M/TID		X				2	200
On-farm ag drainage treatment (pilot project)		H	P				X	X	X	3	
Sediment management plan for Merced watershed (identify sources)		-	S		X					2	
Pilot gravel ripping study on Stanislaus			S				X			2	
Stanislaus Watershed Projects: East Stanislaus RCD	42*	na		East Stan. RCD			X				550
Watershed Projects: Tuolumne and Calveras counties RCD	60*	na	P	Stan. Basin Stake.		X	X				600

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
SPAWNING GRAVEL AND COARSE SEDIMENT MANAGEMENT *Coarse sediment management actions may include source identification, spawning gravel acquisition, and gravel introduction. Examples of potential coarse sediment management related actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Merced River Ranch - purchase dredger tailings	7	H	P	DFG	X					1	1,500
Spawning gravel introduction near LaGrange	36	H	P	TRTAC		X				1	155
Goodwin Canyon gravel replenishment and monitoring	21, 50*	H	P	DFG, DOI			X			1	250 + 190
Identify gravel sources for restoration		M	S				X				
Coarse sediment deficit/replenishment criteria : Merced	8	M	S	DFG	X					2	50
Coarse sediment deficit/replenishment criteria: Stanislaus	24		S	DFG			X			1	50
Identify locations to introduce gravel: Tuolumne., Merced		-	S	DFG	X	X					
Knights Ferry gravel replenishment and monitoring	45*, 46*	na	P	Stockton East, ACOE			X				260 + 140

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
WATER QUALITY ASSESSMENT AND POLLUTANT CONTROL *Water quality actions may include identification of pollutant sources, evaluation of effects, pollutant control, or monitoring, in order to identify and reduce impacts on salmonids and other resources. Examples of potential water quality management related actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Expand Real-time Water Quality Management Network	30	H	P	DWR, SJRMP	X	X	X	X	X	1	300
Incorporate Tuolumne model with RTWQMN		H	P	DWR, TID		X				1	
Reduce non-point pollution - expand contaminant project work team scope (IEP review and guidance)		H	P		X	X	X	X		1	
Establish monitoring for physio/chemical/temperature contaminants, including bioassays, dairy waste, impacts on food supply and dormant pesticide dispersal		M /H	S		X	X	X	X	X	1	

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
FLOW MANAGEMENT *Flow management actions could include acquisition of water, evaluation of potential sources, evaluation of water needs for fisheries, or assessment of water management operations. Examples of potential flow management related actions include the following.*											
Water acquisition for all life stages (AFRP)		H	P		X	X	X	X			
Tuolumne River flow enhancement study	37	-	S	TRTAC		X				1	100
Study in-stream flow needs for smolt survival		H	S				X			1	
Assessment/Feasibility of channel maintenance flows		-	S				X			3	200
Evaluate reoperation of New Melones to mimic seasonal flow variability		H	S				X			1	
Assess ground water management, water transfers, distribution system efficiency		H	S		X	X	X	X		3	300
HATCHERY MANAGEMENT *Hatchery management actions could include evaluation of existing hatchery operations, assessment of new hatchery needs, or studies of hatchery impacts and benefits. Examples of potential hatchery management related actions include the following.*											
Interim artificial propagation program	15	-	P	DFG et al.	X	X	X	X		1	400
Hatchery fish marking program	32	H	P	DFG	X					1	130
Develop a hatchery strategy for the SJR		M	S		X	X	X	X	X	1	
Review and revise operation plan for Merced River Fish Facility		M	S	DFG	X					1	
Tuolumne River Hatchery Plan	13	-	S	DWR, DFG		X				1	1,000

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
TEMPERATURE *Water temperature related actions not included under flow or riparian restoration include increased modeling or monitoring work and evaluation of additional temperature management options.. Examples of potential water temperature related actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Supplemental money for Grasslands to change from March to April		H	S				X			2	
Action to ease water demand from New Melones for agricultural drainage		H	S				X			3	
Feasibility study of temperature management - Merced	6	H	S	DFG et al.	X					2	100
Feasibility study of temperature management - Stanislaus	23, 40*	H	S				X			2	200
Stanislaus River Temp Model and Operations Development	43*	na		Stan. Basin Stake-holders			X				385

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
RIPARIAN REVEGETATION AND RESTORATION *Revegetation and restoration projects include riparian corridor land easements or acquisition, rehabilitation of riparian areas, and related land use changes. Examples of potential riparian revegetation and restoration actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Purchase and restore land at Basso Bridge	35	M	P	DFG		X				1	350
Manage post-flood land use for riparian growth		-	P		X	X	X	X	X		
Riparian restoration/revegetation - Tuolumne River near LaGrange	39	-	P	TRTAC		X				1	275
Riparian preservation (e.g. conservation easements)		H	S		X	X	X	X	X	3	
Riparian revegetation projects		M	P	-	X	X	X	X	X		
Riparian habitat restoration and monitoring, Stanislaus River (pilot project)	47*	na	P	ACOE et al.			X				70
Stanislaus Floodplain Restoration Pilot Project	61*	na	P	Stan. Basin Stake-holders			X			1	3,000

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
MISCELLANEOUS *Miscellaneous actions may inclucde baseline data collection, land acquisition, or research projects with application to known resource problems in the basin. Example of potential actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Adult salmon counting structures	34	-	P	M/TID	X	X	X	X		3	300
Improving Stanislaus River escapement monitoring: feasibility of using hydroacoustics	34b	-	S	Stockton East			X				180
Expand San Joaquin National Wildlife Refuge on the Tuolumne and San Joaquin rivers		M				X		X			
San Luis National Wildlife Refuge expansion on the San Joaquin River		M							X		
Purchase Hills Ferry Barrier land to ensure access and reduce straying	28	H	P	DFG, DWR	X	X	X	X	X	1	60
GIS database of habitat and fluvial elements for Stan.	39	-	S				X			3	
Fall run salmon otolith and scale evaluation	41*	na	S	DFG	X	X	X				45
Scale analysis for racial and age composition of chinook	57*	na	S	SJTA, et al.	X	X	X	X		1	85
Stanislaus channel and flood plain maintenance policy	44*	na	S	Stan. Basin Stake-holders			X				11
Smolt mortality study	55*	na	S	Oakdale and SSJID			X				100
Verification and calibration of screw-trap estimates of Stan. River outmigrants: Feasibility of using hydroacoustics for smolt survival.	49*	na	S	Stockton East			X				195

	Writeup Number[1]	Rank[2]	Project or Study[3]	Project Proponent	Merced	Tuolumne	Stanislaus	SJR below Merced	SJR above Merced	Readiness[4]	Cost Estimate ($1,000)
EDUCATION PROGRAMS *Restoration actions can be made more effective by implementing associated education projects to increase overall public awareness or to target particular audiences to modify behavior. Actions may include development of educational programs, facility planning, and other activities. Example education related actions include the following. Writeup numbers with an asterisk (*) were submitted independently after the workshop, and were not discussed or recommended by the group.*											
Tuolumne River Environmental Education Center	38	M	P	DFG		X				1	40
Tuolumne River Interpretive Center Conceptual Plan	17		P	DFG		X					50
Resources education program	31	-	P	DFG	X	X	X	X	X	2	200
Public and angler education programs	17	M	P	DFG	X	X	X	X	X	1	50
Information sharing network for the San Joaquin watershed	59*	na	P	Water On-line	X	X	X	X	X	1	50

LEGEND

[1] * = description submitted independently after the workshop. No group discussion or recommendation of the proposal.

[2] H = high priority
M = medium priority
L = low priority
- = no consensus
na = not applicable. Description submitted independently after the workshop, without group discussion or ranking.

[3] P = project
S = study

[4] Readiness indicates the level of planning for the project.
1 = ready to implement
2 = preliminary planning completed
3 = project concept needs development

Prepared by P.J. Landis (DWR) and S.D. Wilcox (EA)

5. CONCLUDING COMMENTS

The workshop concluded with a discussion of comments on the procedures and process used during the preceding two days. Suggestions were solicited for changes which would benefit future workshops in other geographical areas. The following comments were recorded.

- Develop the life cycle/stressor flow charts (or at least a draft for discussion) ahead of time, so more of the group time could be spent on other activities.
- Transmit background materials sooner, to allow for a more thorough review and preparation of comments prior to the workshop.
- Allow 2.5 days for the conference, perhaps by reserving the evening when participants arrive for presentations of background information.
- Develop a better ranking system for prioritization of potential projects. Provide more time for and explanation of the ranking process.
- Spend more time back in the plenary session after the breakout groups, in order to discuss more of the details of each respective group's decisions.
- Place more emphasis on ecosystem wide concerns, rather than primarily on chinook salmon. Examples might include other indicator elements, geomorphic approaches, identification of projects that simulate natural processes, etc. The ecosystem level emphasis might be facilitated by an ecosystem presentation at the beginning of the workshop.
- The good attendance was a positive factor for the workshop.
- Provide more direction for the breakout groups so the final products can be more readily integrated.
- Provide more time for identification and discussion of stressors.
- Have more presentations from people working in the field.
- Re-evaluate whether the groups really needed to break out into subgroups.
- Identify investigative needs, such as water quality.
- Address other species and biophysical factors.

In addition to the suggestions for improving future workshops, the participants identified concerns outside of the geographical focus of the workshop that needed to be considered. It was noted that the factors outside of the San Joaquin River basin could affect fall run chinook salmon populations to such an extent that restoration actions within the basin may be less effective. Concerns recorded for areas outside of the San Joaquin River basin included the following:

- Migration blockage due to dissolved oxygen barriers in the Delta
- Ocean fishery effects
- Delta barriers
- Effects of SWP and CVP, including entrainment and reverse flows
- Ocean conditions
- Upstream flow issues (e.g., lack of releases from Friant Dam).

Workshop Report Review

This report was distributed for review by the technical team participants. CALFED received nine comment letters (Appendix J), other comments written on copies of the preliminary draft report, and informal comments in a meeting on March 3. Many of these comments were incorporated into this draft of the report. Some comments are being used by the CALFED program to improve future planning efforts, and other comments raised policy issues that will be resolved in the appropriate forum.

Appendix A

Workshop Agenda and Attendee List

Joint CALFED/SJRMP
San Joaquin River Fishery Technical Team Meeting
January 15 - 16, 1997
Bass Lake

Draft Agenda

Workshop Objective *Develop a package of prioritized fishery restoration projects to be implemented over the next three to five years.*

Wednesday - January 15

7:30 - 8:30	Breakfast
8:30 - 9:00	Introductions
9:00 - 10:00	Review of Workshop Objectives and General Information
10:00 - 10:15	Break
10:15 - 11:00	Present a brief history of the SJR system including an overview of habitat and population conditions
11:00 - 12:00	Present findings of existing studies and management plans including goals and objectives for restoration
12:00 - 1:00	Lunch
1:00 - 3:00	Identify and prioritize problem areas and limiting factors
3:00 - 3:30	Break
3:30 - 5:00	Identify solutions
6:30	Dinner

Thursday - January 16

7:30 - 8:30	Breakfast
8:30 - 10:00	Identify solutions (continued)
10:00 - 10:15	Break
10:15 - 12:00	Prioritize solutions
12:00 - 1:00	Lunch
1:00 - 3:00	Get consensus on package of projects
3:00 - 3:30	Break
3:30 - 4:00	Finalize funding package as a SJRMP Report
4:00 - 5:00	Follow-up workshop to address regulatory and permitting issues

- Workshop to address regulatory and permitting issues
- Advice on improving meeting format

Attendee List

CALFED/SJRMP Joint Technical Team Meeting
Bass Lake, January 15-16, 1997

Name	Affiliation	Phone number
David Bernard	CalFed/ESSA	(604) 733-2996
Jennifer Bull	CDFG	(209) 948-7435
John Cain	UCB	(510) 486-0963
Steve Cramer	Cramer Assoc.	(503) 669-0133
Cindy Darling	CalFed	(916) 657-2666
Kevin Faulkenberry	DWR	(209) 445-5236
Steve Ford	DWR	(916) 227-7534
Tim Ford	MID/TID	(209) 883-8275
Kate Hansel	CalFed	(916) 653-1103
Susan Hatfield	EPA	(415) 744-1994
Dale K. Hoffman-Floerke	DWR	(916) 227-7530
Elise Holland	The Bay Institute	(415) 721-7680
Bill Johnston	Modesto Irrigation District	(209) 526-7384
Fred Jurick	CDFG	(916) 657-4226
Bill Kier	Kier and Assoc.	(415) 331-4505
Paula J. Landis	DWR	(209) 445-5289
Sam Lohr	USFWS	(209) 946-6400
Bill Loudermilk	CDFG	(209) 243-4005 ext. 141
Alice Low	CalFed/CH2M Hill	(916) 920-0212 ext. 282
Scott McBain	McBain and Trush	(707) 826 -7794
Clarence Mayott	CDFG	(209) 222-3761 ext. 171
Carl Mesick	Mesick Consultants	(916) 620-3631

Peter Moyle	CCSF/U.C. Davis	(916) 752-6355
Tim Ramirez	Tuolumne River Preservation Trust	(415) 292-3531
Pete Rhoads	MWDSC	(916) 650-2620
Stephani Spaar	DWR	(916) 227-7536
Tom Taylor	Trihey & Assoc.	(510) 689-8822
Martha Turner	CA Center for Public Dispute Resolution	(916) 444-2161
Jennifer Vick	Phil Williams Assoc.	(415) 981-8363
Scott Wilcox	CalFed/EA	(916) 924-7450
Kevin Wolf	Stanislaus Basin Stakeholders Facilitator	(916) 758-4211
Marcia Wolfe	MHWA for FWUA	(805) 837-1169

Appendix B

Summary of Presentation by Jennifer Vick

Summary of Presentation by Jennifer Vick
CALFED/SJRMP Workshop
January 15-16, 1997

The Merced River provides a typical example of the type and scale of human impacts that have occurred on the San Joaquin River east side tributaries - the Tuolumne, Stanislaus, and Merced rivers. Each has undergone similar patterns of dam construction, flow diversion, gold mining, and aggregate mining.

Flow in the Merced River is controlled by four mainstem dams and several tributary dams. The largest of the mainstem dams is the New Exchequer, which controls runoff from 82% of the watershed. This dam was closed in 1967 and has a capacity of 1.03 million acre-feet (or 105% of the average annual runoff of the watershed). It replaced the original Exchequer Dam, which was closed in 1926 and had a capacity of 281,000 acre-feet.

The dam stores high winter and spring flows, releasing water during the summer for diversion into the Merced Irrigation District's Main Canal. The flow storage and diversion alter downstream hydrology by reducing winter storm and spring snowmelt peaks, converting the annual hydrograph from its dynamic natural pattern to a nearly uniform pattern.

The river also has been subject to extensive gold and aggregate mining. Between 1907 and 1952, the river and floodplain in the vicinity of Snelling were dredged for gold. In this process, the channel bed and floodplain were excavated to the depth of bedrock (about 25 feet) by continuous bucket dredges. The gold was removed from the alluvium and the remaining material was redeposited in windrows on the floodplain. This process converted 7.6 square miles of floodplain to cobble-armored windrows.

Large-scale aggregate mining began in the 1940s and continues today. Until the 1970s, mines excavated sand and gravel directly from the river bed, leaving behind large pits in the channel. After 1970, mines began excavating pits in the floodplain adjacent to the river channel. These pits were separated from the river by narrow berms, which often breached during high flows. A total of 8 in-channel and 22 terrace mines were identified on the Merced River. Seven of the terrace mines were captured or breached.

Mining has left behind 5.6 river miles (273 acres) of in-channel or captured pits in the Merced River between Snelling and Cressey, converting 33% of the spawning reach to slack-water lakes. In addition, the mines removed between 7 and 14 million tons of stored bed material from the channel and floodplain. This amount equals 22-to-91 times the amount of bed material that would have been supplied to the lower watershed in the absence of the dam.

In addition to the impacts described above, damming and mining have resulted in extensive floodplain and channel alteration. Major impacts include the following: reduced in-channel and floodplain complexity, facilitation of floodplain encroachment and elimination of the slough complex formerly located between Snelling and Shaffer Bridge, a 33% reduction in average channel width, channel incision, and bed armoring.

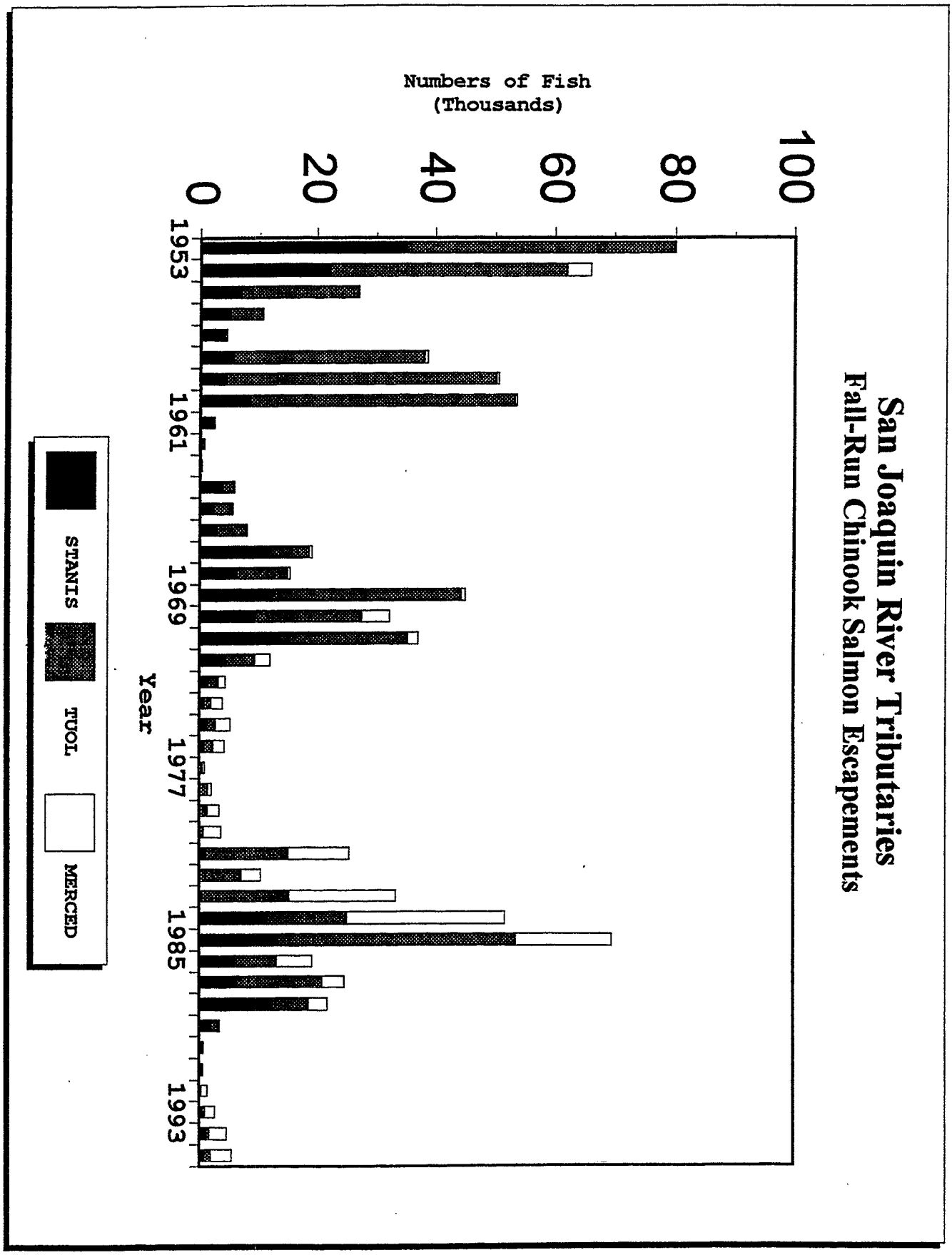
With the degree of alteration in bed material supply and transport in the lower river, there are no mechanisms by which the Merced River can be restored by natural processes. Restoration of fluvial processes and ecological functions in the lower watershed will require human intervention.

More detailed information from this research project is presented as Chapter 8 of the following report:

Kondolf, G.M., J.C. Vick, and T.M. Ramirez. 1996. Salmon Spawning Habitat in the Merced Tuolumne, and Stanislaus Rivers, California: An Evaluation of Project Planning and Performance. University of California Water Resources Center Report No. 90, Davis, CA.

Appendix C

Escapement Data
From Bill Loudermilk


San Joaquin River Tributaries
Fall-Run Chinook Salmon Escapements
Numbers of Fish
(Thousands)
0
20
40
60
80
100
1953
1961
1969
1977
1985
1993
Year
STANIS
TUOL
MERCED

Appendix D

Summary of Comments by David Bernard

E-028915

APPENDIX D
SUMMARY OF COMMENTS BY DAVID BERNARD

David Bernard provided a brief overview of several ecosystem restoration concepts as an introduction to the workshop sessions on identification of system stressors and potential restoration actions. One of the concepts related to changes in the state of the system over time, or hysteresis. Hysteresis is the inability of a property, or system, to return to its original state after it has been changed by some external agent, even if the cause of the change has been removed. In the context of habitat restoration actions, hysteresis means that "you cannot have the old system back." As a result, it becomes particularly critical to define what you want the new system to look like so that restoration actions can be taken accordingly.

Three possible goals for restoration actions were reviewed: 1) restore to original elements, 2) restore to original function, and 3) restore to usefulness. Restoring to the original elements of the ecosystem before any perturbation is usually not possible, given the magnitude of change and the passage of time. Restoring original function may be possible, and can have the added benefit of restoring the usefulness of the system at the same time. Restoring to usefulness, in the absence of restoring original function, may be beneficial but is likely to be very management intensive.

The importance of monitoring restoration actions and adaptively managing them was emphasized as part of a "do it, evaluate it, fix it" cycle that iteratively refines the restoration actions until the desired goal is acheived. The monitoring component of this cycle is critical for refining the restoration actions, although the monitoring results may challenge assumptions of our understanding of the system. The adaptive management approach is necessary to provide the "fix it" portion of the cycle, particularly since our historical pattern has been more of a "do it, evaluate it, go to war over it" scenario.

Appendix E

Summary of Presentation by Paula Landis

Fishery Restoration Programs and Funding Sources
Presentation by Paula J. Landis
CALFED/SJRMP Workshop
January 15-16, 1997

A high level of frustration is being felt by water users and fish protection agencies at the slow progress being made toward improving conditions for salmon on the San Joaquin system. Water users see themselves as being blamed for the decline in fish populations and at the same time they see millions of dollars they have contributed to fund projects not being spent. Fish agencies are frustrated by the difficulty in accessing those same funds. The California Department of Fish and Game also feels they are being pressured to come up with projects for the sake of projects without consideration for the potential benefits of those projects.

In an attempt to resolve this problem, SJRMP provided a forum to bring together interested parties and stakeholders to examine why the system is not working and determine how to change it. The first step in this process was to identify existing funding sources and the criteria for awarding funding. The results of this investigation included identifying funding sources, project submittal requirements, deadlines, contact person, determining the similarities and differences in funding source requirements, and listing potential projects. This information that is being used to move projects forward to implementation, by matching project benefits with funding program priorities and by combining funding from different programs. The next step will be to prioritize project proposals and determine which funding sources each proposal should be submitted to.

CALFED/SJRMP San Joaquin River Fishery Restoration Technical Team Meeting
January 14 -16, 1997

Existing Studies and Management Plans
Bass Lake

Introduction

Most fishery restoration programs have developed management plans to meet the objectives of their funding requirements. These plans range from general guidelines to the identification of specific projects. The majority of fishery related funding programs focus on natural production and non-flow related solutions to fishery issues. Some plans were drafted independent of any specific funding program. These types of plans, developed without the restraints of funding requirements, may provide a more complete picture of problems and solutions faced by fishery restoration interests in the San Joaquin River basin.

Funding Program Management Plans

CALFED Bay-Delta Program	Ecosystem Restoration Program Plan Implementation Objectives and Targets, working draft November 1996.
CVPIA - AFRP	A Plan to Increase Natural Production of Anadromous fish in the Central Valley of California, draft December 1995.
Department of Fish and Game Wildlife Conservation Board	California Riparian Habitat Conservation Program, January 1995.

Management Plans
Not tied to a specific funding source.

Department of Fish and Game	Restoring Central Valley Streams: A Plan for Action, November 1993.
San Joaquin River Management Program	An Action Plan for San Joaquin Fall-Run Chinook Salmon Populations, January 1993.

Existing Studies

Introduction

This list of existing studies is intended to serve as a starting point for discussion. Many studies that are conducted internally by agencies and groups are never formally published for general use. A complete and comprehensive list of studies could be helpful in avoiding the duplication of effort and in identifying areas where studies are needed.

San Joaquin River

Department of Water Resources	Comprehensive Needs Assessment for Chinook Salmon Habitat Improvement Projects in the San Joaquin River Basin, March 1994.
Department of Water Resources	San Joaquin River Tributaries Spawning Gravel Assessment, November 1994.

Merced River

Department of Fish and Game	Merced River Water Supply, June 1990.

Tuolumne River

EA Engineering	Don Pedro Project fisheries study report, 1992.
Turlock Irrigation District	New Don Pedro FERC Settlement Agreement, adopted 1996.
McBain and Trush	Tuolumne River Watershed Analysis, in progress.

Stanislaus River

Department of Fish and Game	Effect of New Melones Project on fish and wildlife resources of the Stanislaus River and Sacramento-San Joaquin Delta, October 1972.
S.P. Cramer & Associates, Inc,.	Effects of pulse flows on juvenile chinook migration in the Stanislaus River, 1993.
S.P. Cramer & Associates, Inc,.	Effects of pulse flows on juvenile chinook migration in the Stanislaus River, 1995.

Carl Mesick Consultants	The Effects of Minimum Instream Flow Requirements, Release Temperatures, Delta Exports, and Stock on Fall-Run Chinook Salmon Production in the Stanislaus and Tuolumne Rivers, draft report May 1996.
Carl Mesick Consultants, Aquatic Systems Research & Thomas R. Payne & Associates	Spawning Habitat Limitations for Fall-Run Chinook Salmon in the Stanislaus River Between Goodwin and Riverbank, draft report July 1996.
U.S. Bureau of Reclamation	Stanislaus River basin temperature model, draft report 1993.
U.S. Fish and Wildlife Service	Anadromous Fish Screen Program. Process document, draft report July 1996.
U.S. Fish and Wildlife Service	Comprehensive Assessment and Monitoring Program Implementation Plan. Draft report, October 1996.
U.S. Fish and Wildlife Service	The Relationship Between Instream Flow and Physical Habitat Availability for Chinook Salmon in the Stanislaus River, California. M.E. Aceituno. Final report, May 1993.

Prepared and Presented by Paula J. Landis, DWR

San Joaquin River Management Program
FISHERY RESTORATION PROGRAMS AND FUNDING SOURCES
February 1997

Programs and Funding Sources	Contact Person/Title	Agency Street Address	Mailing Address	Phone Number Fax Number	e-mail address
CVPIA Anadromous Fish Restoration Plan	Sam Lohr Fisheries Biologist	USFWS 4001 North Wilson Way Stockton, CA 95205	same	(209) 946-6400 (209) 946-6355	slohr@ mail.fws.gov
CVPIA Anadromous Fish Screen Program	Ron Bachman Project Manager AFSP	USFWS 3310 El Camino Sacramento, CA 95821	same	(916) 979-2760 (916) 979-2770	Ronald_Bachman @fws.gov
CVPIA Spawning Gravel/ Riparian Habitat	Larry Puckett Restoration Program Project Manager	USFWS 3310 El Camino Sacramento, CA 95821	same	(916) 979-2760 (916) 979-2770	Larry_Puckett @fws.gov
CALFED - including Category III	Cindy Darling Restoration Coordinator	CALFED Bay-Delta 1416 Ninth Street, 1155 Sacramento, CA 95814	same	(916) 653-5950 (916) 654-9780	cdarling @water.ca.gov
Four Pumps Agreement (DWR/DFG)	Steve Ford Environmental Program Manager	DWR 3251 "S" Street Sacramento, CA 95816	same	(916) 227-7534 (916) 227-7554	sford @water.ca.gov
Tracy Pumps Agreement	Pat Coulston Supervising Biologist	DFG 4001 North Wilson Way Stockton, CA 95205 1416	same	(209) 948-7800 (209) 946-6355	pcoulsto@ delta.dfg.ca.gov
Wildlife Conservation Board	Scott Clemons Riparian Program Manager	WCB 801 K Street, Suite 806 Sacramento, CA 95814	same	(916) 445-1072 (916) 323-0280	clemons@ mailbag.des. ucdavis.edu
New Don Pedro Settlement Agreement	Tim Ford Aquatic Biologist	TID/MID 333 E. Canal Drive Turlock, CA 95380	P.O. Box 949 Turlock, CA 95381	(209) 883-8275 (209) 632-3864	tjford@ainet.com

San Joaquin River Management Program
FISHERY RESTORATION PROGRAMS AND FUNDING SOURCES
February 1997

Programs and Funding Sources	**Contact Person/Title**	**Agency Street Address**	**Mailing Address**	**Phone Number Fax Number**	**e-mail address**
CDFG Fishery Restoration Grants (Salmon Stamp & Proposition 70)	Mary Brawner/ Harvey H. Reading Inland Fisheries Division	CDFG Inland Fisheries Division 1416 Ninth Street Sacramento, CA 94244	P.O. Box 944209 Sacramento, CA 94244-2090	(916) 654-5628 (916) 654-8099	103731,2032. compuserve.com (Brawner)
USACOE, Section 1135	Jinji Kobayashi, Chief San Joaquin Basin Branch and Planning Division	USACOE 1325 J Street Sacramento, CA 95814	same	(916) 557-6778 (916) 557-7856	not available

Two potential funding sources identified previously have been removed from this list. Funding provided by the City and county of San Francisco is included in the New Don Pedro Settlement Agreement. The Department of Conservation does not have funding for river restoration work.

Prepared by Paula J. Landis, DWR

San Joaquin River Management Program
Restoration Programs and Funding Sources
Not directly connected to the San Joaquin River or Fall-run Chinook Salmon
February 1997

Programs and Funding Sources	Contact	Phone Number
Caltrans	Cathy Crossett-Avila	(916) 227-8035
Ducks Unlimited		(916) 363-8257
1996 USDA Farm Bill	U. S. Dept. of Agriculture Washington D.C. 20250	
CDFG Steelhead Catch Program	Terry Jackson, CDFG	(916) 654-1811
CDFG Striped Bass Stamp	Don Stevens, CDFG	
Bay Delta Regional Initiative	Alexis Strauss, EPA	
Federal Land & Water Acquisition Fund	Gary Zamh	
CWA Grant Funding	Alexis Strauss, Walt Pettit EPA, SWRCB, RWQCB	
California Waterfowl Association	Bill Gaines	
Energy and Water Fund	USBR	
San Francisco Bay Program	Rick Morat, USFWS	
State Revolving Fund	Walt Pettit, SWRCB	
Proposition 99	Terry Mills, CDFG	
Environmental Enhancement and Mitigation Program	California Transportation Commission	
Delta Flood Protection Act	Curt Schmutte, DWR Ed Littrell, DFG	
Private Foundations		

San Joaquin River Management Program
FISHERY RESTORATION PROGRAMS AND FUNDING SOURCES
February 1997

Programs and Funding Sources	Activity Funded																
	Species Specific	Geographic Boundary	Priority Projects	B/C Ratio	Cost-Share (applicant/source)	Fund Feasibility	Preliminary Design	Environmental Review	Final Design	Administration & Consultants	Monitoring Funded	Repair & Maintenance	Repayment Clause	Reimbursable Startup Funds	Formal Applications	Filing Date	Phased Projects
AFRP	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y
Fish Screen Program	Y	Y	N	N	50/50	Y	Y	Y	Y	Y	N	N	N	Y	Y	N	Y
Spawning Gravel Rest.	Y	Y	Y	N	25/75	Y	Y	Y	Y	N	N	N	N	N	N	N	Y
CALFED / Category III	Y	Y	Y	N	S	Y	Y	Y	Y	?	Y	S	?	Y	Y	Y	Y
Four Pumps Agreement	Y	Y	Y	S	N	Y	Y	Y	Y	Y	S	Y	N	?	N	N	Y
Tracy Pumps Agreement	Y	Y	S	N	N	S	Y	Y	Y	Y	N	S	N	Y	N	N	Y
Wildlife Conservation Bd.	Y	N	N	N	25/75	N	Y	Y	Y	Y	S	N	Y	?	Y	N	Y
Don Pedro Agreement	Y	Y	N	N	S	Y	Y	Y	Y	Y	Y	Y	N	?	N	N	Y
DFG Fishery Restoration	Y	N	Y	N	S	N	Y	N	Y	Y	N	N	?	S	Y	Y	Y
USACOE, Section 1135	N	N	N	Y	S	Y	Y	Y	Y	Y	S	N	N	N	N	N	Y

N = No
Y = Yes
S = In some cases
? = A steering committee decision is required or no official rule exists.

E—028925

Appendix F

Life Cycle and Stressor Diagrams

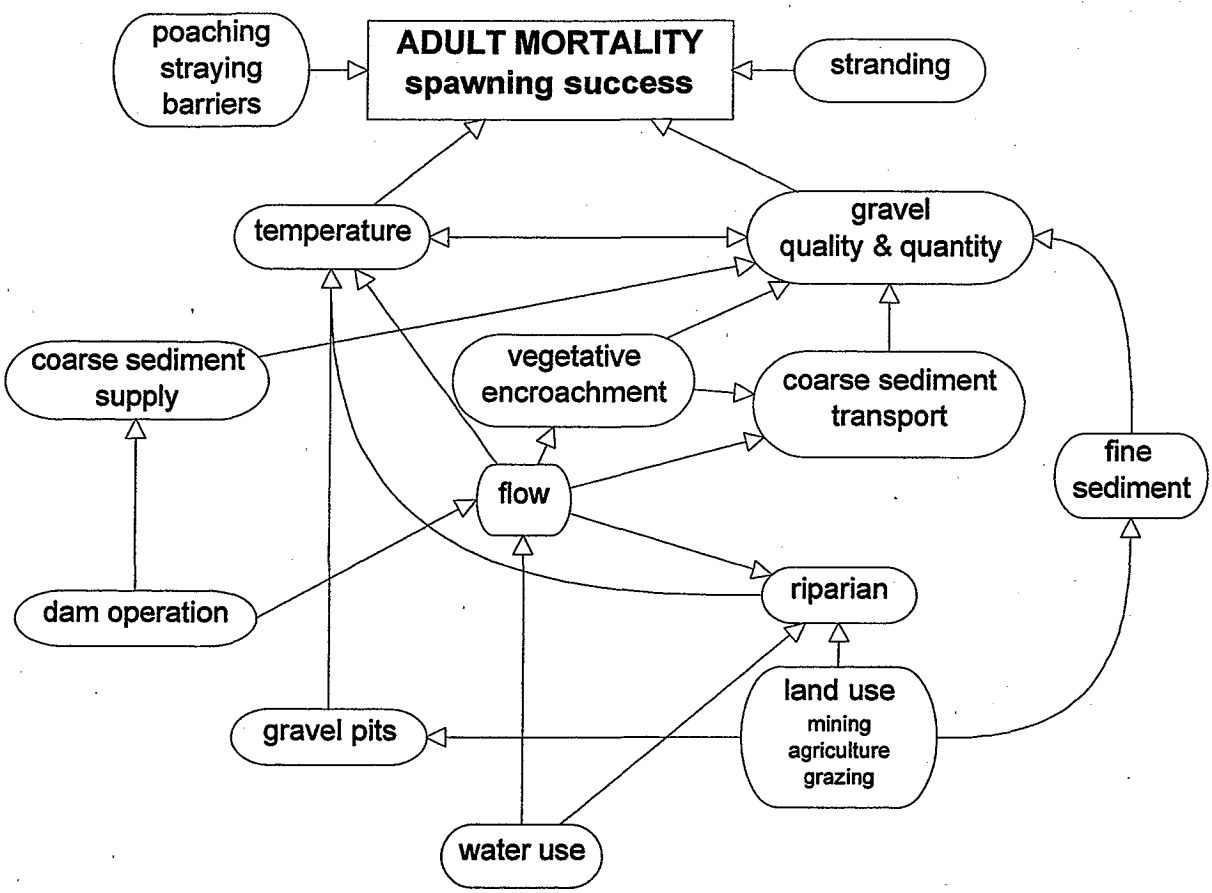


Figure F-1. Stressor chart for adult fall run chinook salmon in the Tuolumne, Merced, and upper San Joaquin rivers.

f:\projects\calfed\public\adult.sg

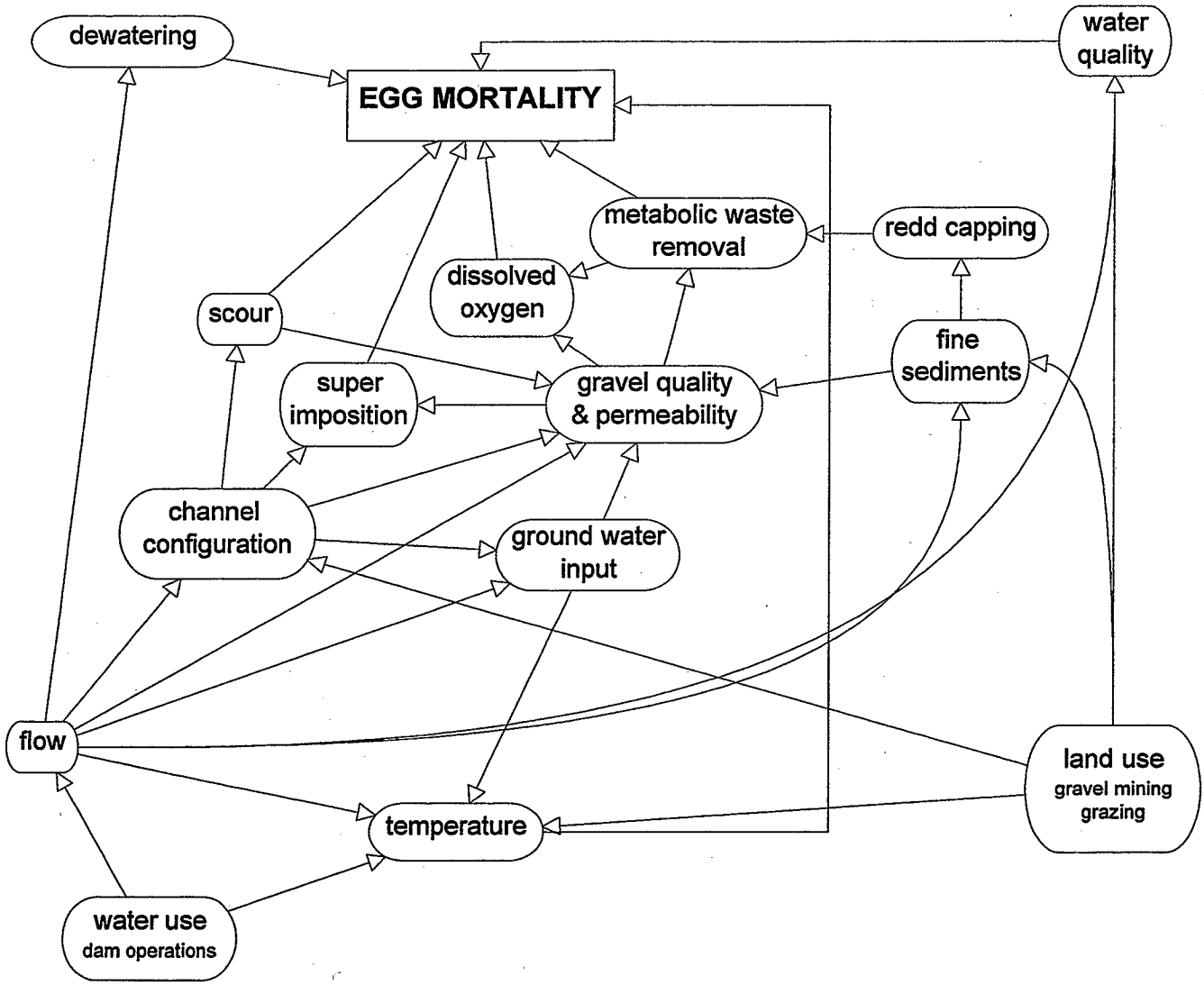


Figure F-2. Stressor chart for fall run chinook salmon eggs in the Tuolumne River and Merced River.

f:\projects\calfed\public\egg.sg

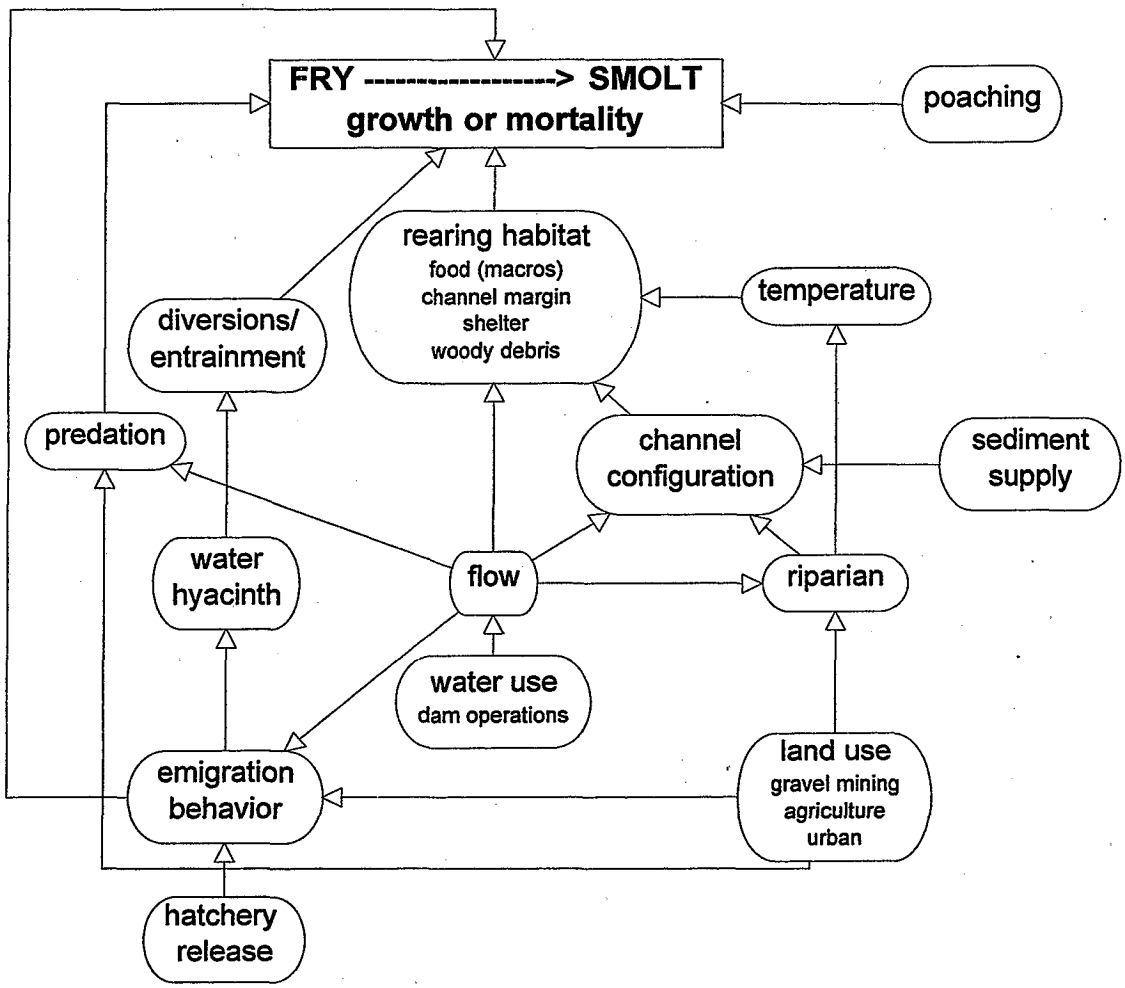


Figure F-3. Stressor chart for fall run chinook salmon fry and smolts in the Tuolumne, Merced, and upper San Joaquin rivers.

f:\projects\calfed\public\fry-smlt.sg

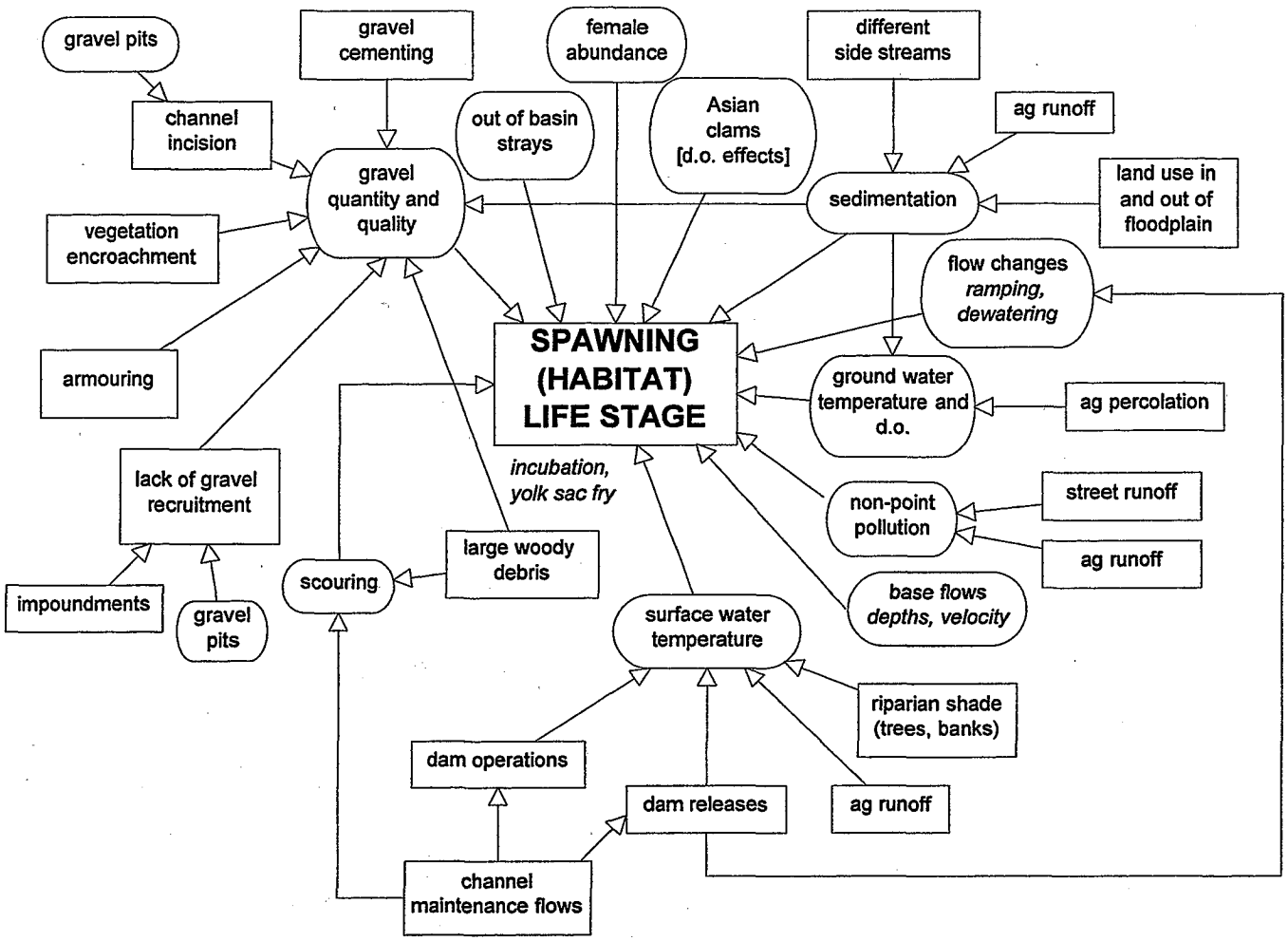


Figure F-4. Stressor chart for spawning fall run salmon in the Stanislaus River and lower San Joaquin River.

f:\projects\calfed\public\spawn.sg

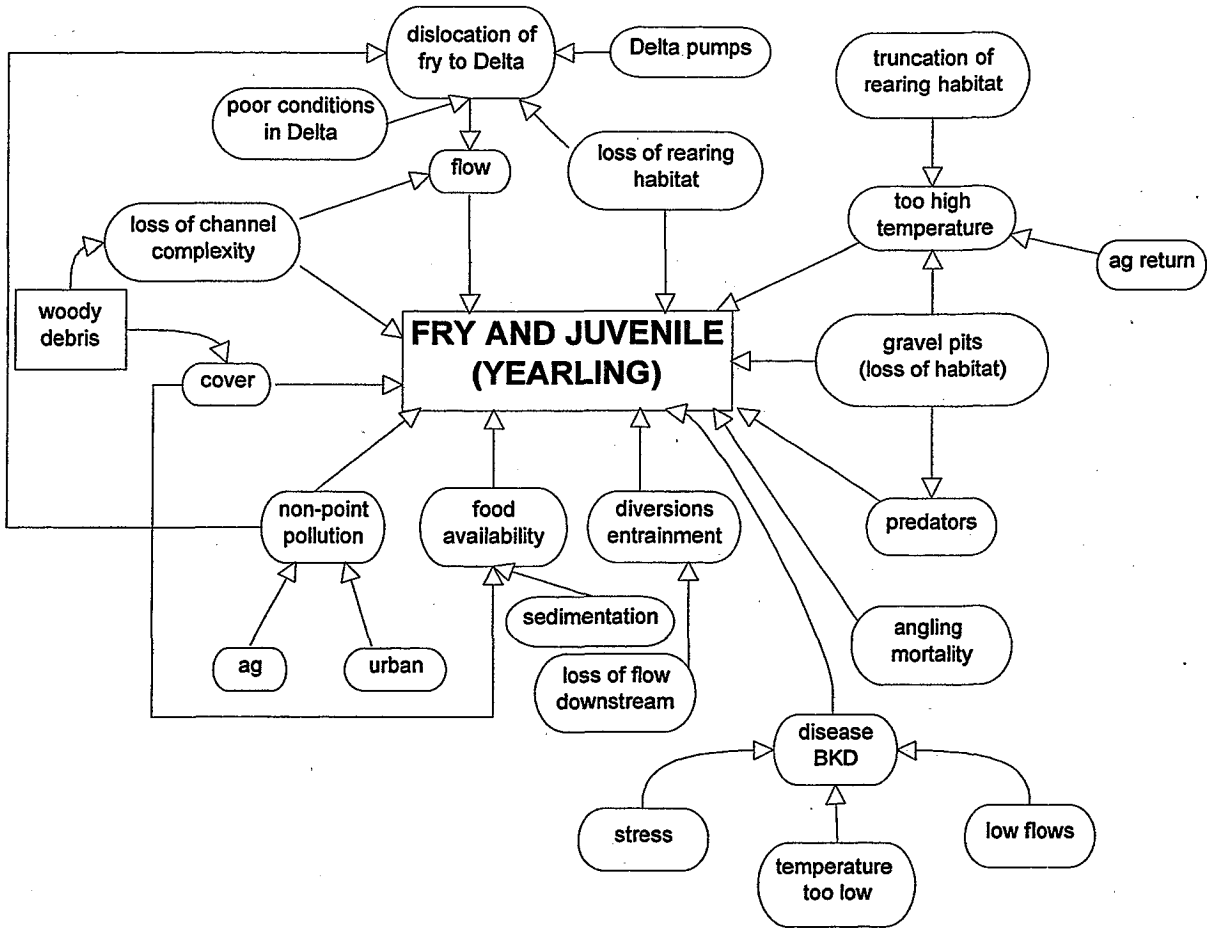


Figure F-5. Stressor chart for fry, juvenile, and yearling fall run chinook salmon in the Stanislaus

f:\projects\calfed\public\yearling.sg

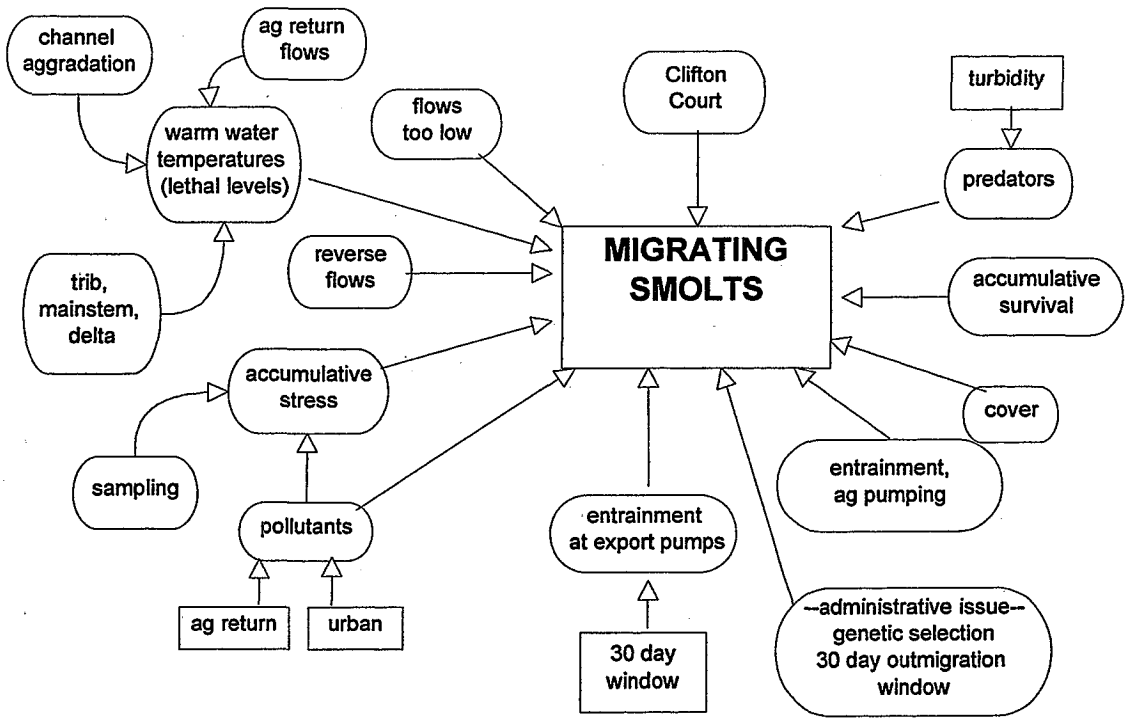


Figure F-6. Stressor chart for fall run chinook salmon smolts in the Stanislaus River and lower San Joaquin River.

f:\projects\calfed\public\smlt-mig.sg

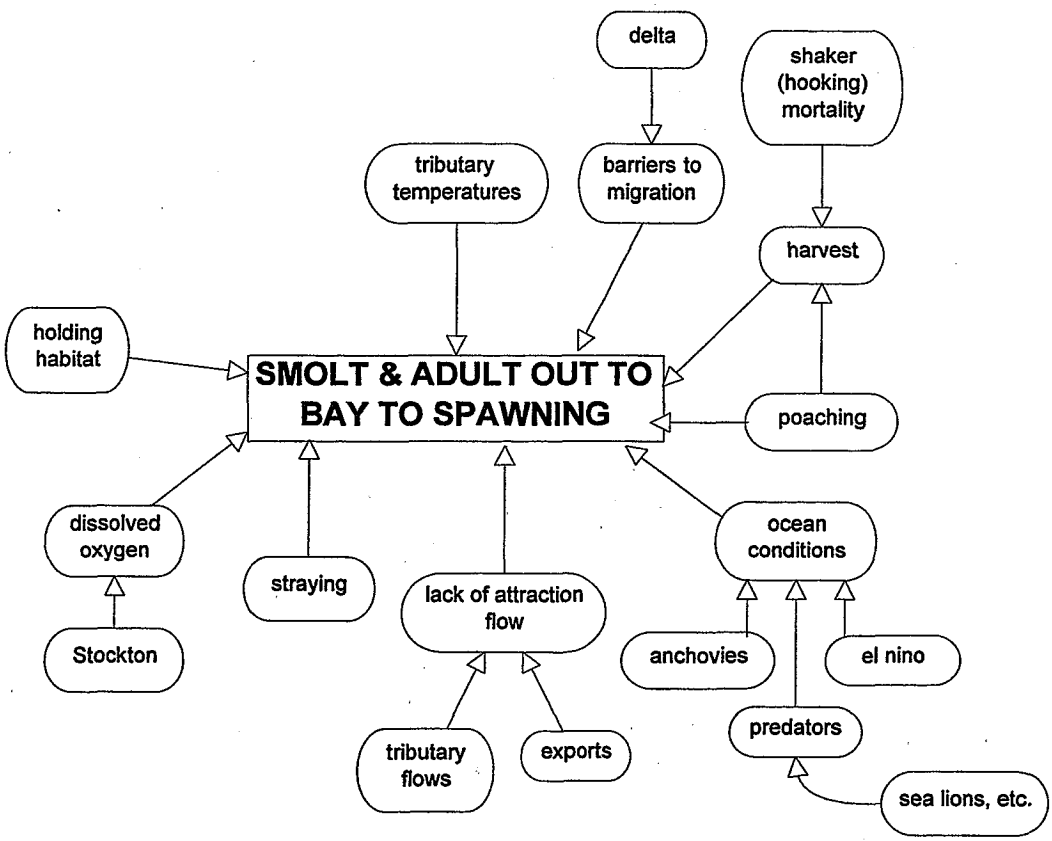


Figure F-7. Stressor chart for fall run chinook salmon smolts and adults in the Stanislaus River and lower San Joaquin River.

f:\projects\calfed\public\smlt-adt.sg

Appendix G

Stressors Identified in the Tuolumne, Merced, and Upper San Joaquin (Stanislaus River Confluence to the Merced River Confluence) Rivers

TABLE G1. STRESSORS ON UPPER FALL RUN CHINOOK SALMON IN THE TUOLUMNE, MERCED, AND LOWER SAN JOAQUIN RIVERS

Stressor	Affected Life Stage			
	Adult	Egg	Fry	Smolts
Inadequate instream flows (for attracting adults, flushing flows for bed maintenance)	✓	✓	✓	✓
Poaching, illegal harvest	✓			✓ (including post-smolts)
Entrainment (water diversions)			✓	✓
Poor or missing spawning habitat	✓			
Habitat access (barriers to migration)	✓			
Predation (introduced species and others)			✓	✓
Stranding	✓	✓	✓	✓
Water temperature (surface)	✓ (fall)	✓	✓	✓
Water temperature (groundwater)		✓		
Large woody debris losses (refuge habitat)	✓		✓	✓
Water pollution (agricultural organics)		✓	✓	✓
Ocean harvest	✓			
Ocean conditions (oceanographic)	✓			✓
Lack of shallow water rearing habitat			✓	✓
Flow pattern (outflow timing, variability)	✓	✓	✓	✓
Riparian vegetation loss	✓	✓	✓	✓
Lack of food supply	✓		✓	✓
Migratory pathway changes	✓			✓
Hatchery management (genetics)	✓ (genetic integrity, fitness)		✓ (intraspecific interactions)	✓
Diseases	✓	✓	✓	✓
Accelerated sedimentation		✓	✓	
Introduced species	✓ (water hyacinth)	✓ (Asian clams)	✓ (Asian clams)	✓ (water hyacinth)

Stressor	Affected Life Stage			
	Adult	Egg	Fry	Smolts
Gravel deficit	✓			
Lack of floodplain		✓ (redd scour)	✓ (high flow velocity)	
Gravel and gold mining effects (changes lotic to lentic system)	✓	✓	✓	✓
Channel form, channelization (sinuosity)			✓	✓
Straying	✓			
Entrainment at Delta export pumps	✓		✓	✓
Delta flows				✓
Spawning bed armoring	✓	✓	✓	
Low escapement	✓			
Global warming	✓	✓	✓	✓
Nutrient loss, reduced recruitment				✓
Fishing regulations		✓ (redd disturbance by anglers)		
Riparian vegetation encroachment	✓	✓		

Appendix H

Brief Project Descriptions by SJRMP Fisheries Subcommittee and Meeting Attendees

PROJECT TITLE: RATZLAFF RANCH CHANNEL RESTORATION (#1)

LOCATION: Merced River near Hopeton, just downstream of Highway J59 Bridge.

PROBLEM ADDRESSED: Failure of floodplain gravel mining levees has resulted in ponded sections of the Merced River channel within the designated salmon spawning and nursery area (Fish and Game Code 1505). Water depths increase and velocities decrease forming lacustrine habitat within a key salmon nursery area. Abnormally high predator densities are maintained in and near these areas. The physical loss of channel, floodplain and riparian function, combined with elevated temperatures and higher predation rates has degraded both the habitat quality and quantity.

BENEFITS: Restore more natural function in the low flow channel, floodplain and riparian areas, reestablish usable nursery habitat, and reduce mortality of juvenile salmonids (fry and smolt) due to predation.

PROJECT DESCRIPTION: Biologists, fluvial experts and engineers will develop conceptual, preliminary and final design plans to restore more effective habitat and natural functions at this site. Construction activities will focus on modifying or restoring the breached levees and ponded areas to a) isolate these areas from the restored riverine habitats, or b) modify them so they function as floodplain area. Site-specific features, design criteria, benefits and environmental concerns and cost factors will all influence the restoration design.

This area is one of the largest and most complex problem areas on the Merced River. It is just downstream of and linked to the **Robinson Ranch Channel Restoration** project. Combined, these two projects can restore over three miles of important salmon spawning and nursery habitat.

ESTIMATED COSTS: $4,000,000 Cost-share partners will be needed for this project to proceed in 1998-99 or later.

STATUS: Funding from the "4-Pumps" Agreement has been approved for DWR San Joaquin District to develop preliminary design plans and develop up to four specific project proposals for this site. Aerial photograph have been obtained and preliminary design work will be completed by June, 1997. The aerial photograph coverage was extended upstream to include the Robinson Ranch area to assist in preliminary planning there as well. Several project proposals for the Ratzlaff Ranch area are anticipated to exceed funding capabilities under the "4-Pumps" Agreement.

PROJECT PROPONENT: DFG and DWR thus far. Lead entities to be defined.

PROJECT TITLE: ROBINSON RANCH CHANNEL RESTORATION (#2)

LOCATION: Merced River near Hopeton, just upstream of Highway J59 Bridge.

BENEFITS: Restore more natural meander pattern and function in the low flow channel, floodplain and riparian areas, reestablish useable salmon spawning and nursery area, reduce the risk of stream capture of adjacent gravel extraction ponds (pits), and restore a favorable alignment of the channel under the J59 bridge (structure protection). Erosion protection will be included as a project purpose. This reach has supported up to 20% of the natural salmon spawning activity in the Merced River in the past.

PROJECT DESCRIPTION: Biologists, fluvial experts and engineers will develop preliminary and final design plans. Several specific project proposals may be prepared for this site. These may be phased over several years. Construction activities may include levee set-backs, enhancing existing levees, fill, channel realignments, gravel replenishment, designed channel areas to enhance salmon spawning, and restoring meander patterns and protection of the bridge structure (footings) along 1.5 miles of the Merced River. This area is just upstream of the **Ratzlaff Ranch Channel Restoration project.** Design plans must be linked to ensure proper river function in the area. together these two projects can improve over three miles of the Merced River.

ESTIMATED COST: $2,000,000 Cost-share partners will be need for this project to proceed in 1998-99 or later.

STATUS: Aerial photographs and ground surveys have been completed by DWR, San Joaquin District with funding under the "4-Pumps" Agreement. We anticipate several preliminary project proposals will be developed. These may be phased over several years. Negotiations with the landowner are underway by DFG. Preliminary design plans and project proposals for several salmon spawning and nursery habitat improvements and restoration of floodplain and riparian function will follow completion of DFG negotiations. Due to the influence of this reach on the Highway J59 bridge we anticipate that CALTRANS may also participate. A backwater analysis will be performed early in the design phase. The landowner (or gravel company) will have partial responsibility for at least one aspect of the project due to CEQA requirements on a previous gravel mining project.

PROJECT PROPONENT: DFG and DWR at this time. Lead entity to be defined.

PROJECT TITLE: GALLO RANCH RESTORATION PROJECT (#3)

LOCATION: Merced River near Hopeton, approximately five miles downstream of Highway J59 bridge.

BENEFITS: Develop phased plans and proposals to restore more natural function in the low flow channel, improve spawning gravel quantity and quality, improve floodplain and riparian function, reduce erosion, and screen priority water diversions and return channels to protect juvenile and adult salmonids along one mile of the river.

PROJECT DESCRIPTION: Development of phased program proposals for restoration along one mile of salmon spawning and nursery habitat. Disturbance to meander patterns, side channels, erosion and a high percentage of fine substrates, unscreened water diversion and activities in the floodplain has reduce the spawning and nursery potential of this area. Engineering support is needed to assist DFG and the landowner in developing a phased restoration program. Preliminary and final design plans and phased restoration funding proposals would be developed by DFG under this project.

ESTIMATED COST: $200,000

STATUS: The majority of this project is in the conceptual stage at this time. Discussion with the landowner indicates strong interest in compatible restoration activities. The first phase was initiated by DFG in conjunction with the landowner in 1996. Adult salmon migration barriers (temporary weirs) were installed in two agricultural return channels to avoid loss of recruitment and encourage in-river spawning.

Engineering support for preliminary and final design plans is needed for DFG to develop phased project funding proposals for channel/habitat restoration and a fish screen on a gravity diversion. Construction of the projects developed are anticipated would require additional funding and would likely occur beginning in 1999.

PROJECT PROPONENT: DFG

PROJECT TITLE: RIPARIAN DIVERSION SCREENING FEASIBILITY (#4)

LOCATION: Five gravity riparian diversions within the designated spawning area of the Merced River between Crocker-Huffman Dam and Highway J59 bridge.

BENEFITS: Reduce losses of salmonid fry, juvenile and smolts associated with gravity riparian diversions.

PROJECT DESCRIPTION: Provide engineering support to DFG to evaluate screen effectiveness and develop feasibility recommendations for modification or replacement of existing fish screens and bypass systems on five riparian diversions ranging from 20 to 100 cfs. This project would be followed by DFG coordination with water right holders and landowners and preparation of proposals to fund design and construction of identified priority screen modifications or replacements.

ESTIMATED COST: $150,000

STATUS: Three of the five riparian diversion screens were modified and improved in the mid-1980's through the SB 400 program (Sen. Keene). Water-powered screens and nominal bypass systems were installed on two larger diversions while gabion-type screens without bypass systems remain on the other three diversions. Wing-dams are constructed/repaired each year at inlet channels to adjust river stage and facilitate water diversions. This system has been in place for many years and changes are needed to more effectively protect juvenile salmonids.

This project is in the concept stage of development. Engineering support is needed for DFG, and the affected interest parties, to develop feasible project proposals to improve the efficiency and effectiveness of the screen on these riparian diversions. A post-flood inspection will occur once the 1997 high flows subside to evaluate temporary repairs needed this year. This proposal focuses on a longer time horizon and the identification of the feasibility and preliminary cost estimates for fish screen repairs or replacements at these five diversions. If engineering support is provided in FY 1997-98 specific project proposals could be anticipated beginning in FY1998-99.

PROJECT PROPONENT: DFG and affected parties. Lead entity to be defined.

PROJECT TITLE: CHANNEL RESTORATION FEASIBILITY (#5)

LOCATION: Merced River from Crocker-Huffman Dam downstream to Cressey.

BENEFITS: Provide technical support for early planning and preliminary engineering design plans for five additional channel restoration projects on the lower Merced River. The planning provided by this project will help insure that a progression of restoration projects will continue beyond the 1998-2000 period.

PROJECT DESCRIPTION: Biological and engineering information will be compiled and preliminary design plans and project proposals will be prepared for five priority channel restoration projects. Costs for final design plans, permitting, construction, maintenance and monitoring would be identified in the project proposals. Upon subsequent funding approval of these project proposals, construction on the projects proposed would be anticipated beginning in the year 2000 and extending for 3-5 years.

ESTIMATED COST: $300,000

STATUS: This project is in the conceptual stage at this time. Experience suggests that the rate at which restoration projects proceed is strongly determined by the level of early planning and the development of sound project proposals for funding. Absent adequate funding and technical support for project development the rate of project completion, and hence restoration of physical and biological functions, may continue at a slow pace.

PROJECT PROPONENT: DFG and interested parties. Lead entity to be defined.

E-028942

PROJECT TITLE: TEMPERATURE MANAGEMENT FEASIBILITY STUDY (#6)

LOCATION: Lake McClure, Lake McSwain, Merced Falls, Crocker-Huffman Dam and Merced Irrigation District headworks, and the lower Merced River downstream to its confluence with the San Joaquin River.

BENEFITS: Improved natural habitat conditions in a greater frequency of years resulting in better survival and production of a)natural salmonids in the Merced River, and b) artificial production at Merced River Hatchery. Improved spawning and incubation temperatures in the fall and improved rearing temperatures in the spring and early summer may be feasible and would benefit natural production in the Merced River. The value-added aspect of this project is the potential to improve spawning, incubation and rearing conditions, and reduce or help control warm water fish disease outbreaks at Merced River Hatchery.

PROJECT DESCRIPTION: This is the first of three phases of a project to develop improved water temperature management capabilities for salmonid habitats in the lower Merced River. Refinement of existing temperature reservoir and stream temperature models, operational criteria from Merced Irrigation District (MID) and biological needs defined by resource management agencies, would be integrated into an analysis and report describing feasibility and recommendations for designs and implementation efforts. Strong coordination with MID and other affected parties would occur. A contractor would prepare and submit draft and final reports defining the feasibility and recommend a course of action(s) for improved management of water temperature in the Merced River below Crocker-Huffman Dam.

Beyond this initial phase, funding for design, construction and the implementation phases should be anticipated. Again, close coordination with MID, resource management agencies, and affected parties would be necessary.

ESTIMATED COST: $100,000

STATUS: Negotiations between DFG and MID are underway. The parties are discussing the need to evaluate the potential and alternative approaches to improve temperature management on the lower Merced River below Crocker-Huffman Dam. Refined temperature modeling and integration of operational information would help the parties resolve this important issue and lead to improved salmonid habitat conditions in a greater frequency of years. Financial assistance to augment existing technical expertise of these parties is needed to assist with the feasibility study and recommendations regarding temperature management.

PROJECT PROPONENT: DFG and interested parties. Lead entity to be defined.

PROJECT TITLE: MERCED RIVER RANCH ACQUISITION (#7)

LOCATION: Near Snelling, one mile below Crocker-Huffman Dam

BENEFITS: Restoration of 318 acres of riparian forest, wetlands and aquatic habitats while providing a large and cost-effective supply of sand, gravel and cobble for channel restoration projects nearby in the Merced River. Long-term management of riparian forest and access to the Merced River for gravel replenishment would be secured.

PROJECT DESCRIPTION: DFG would acquire in fee title, restore and manage 318 acres of riparian forest, wetlands, adjacent river bank and grassland habitats in perpetuity. The land would be acquired, a surface mining and reclamation plan would be developed, environmental documents prepared, adopted and certified, and necessary infrastructure would be established. Restoration of the site would be implemented incrementally over approximately 10-15 years. Removal and reconfiguration of surface dredger tailings would help restore the site and provide cost-effective materials for various channel restoration projects nearby. It is estimated that 3-4 million yards of usable construction material exists on site.

ESTIMATED COST: $1,500,000

STATUS: The DFG Lands Committee and the Management Committee have reviewed the Land Acquisition Evaluation and recommended to the DFG Director that the acquisition proceed. Initially, funding is needed to support the real estate activities of the Wildlife Conservation Board to acquire the parcel, on behalf of DFG. Contracting for the mining and reclamation plan, environmental permits, easements and developing the necessary infrastructure for the restoration activity to proceed would follow. Restoration activities could begin within four years of the acquisition, and upon completion of all necessary planning and environmental documents, certifications, easements and assurances.
Construction products (sand, gravel, cobble) would be made available pursuant to subsequent project proposals, and the funding necessary to support staff and maintain and operate equipment to complete phased construction of restoration features at the Merced River Ranch site. The initial investment ($1,500,000) in the land, mining and restoration plan and infrastructure would not be amortized to increase the cost of construction materials provided. Thus, cost-effective material (3-4 million yards) would be assured over the longer term through the initial investment provided by this project. Integrating this project with a number of future channel restoration projects may result in a more cost-effective restoration effort, while avoiding further mining excavations in floodplain areas.

PROJECT PROPONENT: DFG

PROJECT TITLE: COARSE SEDIMENT BUDGET/REPLENISHMENT CRITERIA (#8)

LOCATION: Merced River

BENEFITS: Define the needs for future spawning gravel recruitment and establish criteria for artificial replenishment in the designated spawning area below Crocker-Huffman Dam

PROJECT DESCRIPTION: Contract with appropriate technical experts to define the Merced River's "appetite" for coarse sediment, and develop initial criteria (procedures) for replenishing this important component to restore river functions. Funding for this proposal would be used to match existing funds approved for DFG use under Proposition 70. Monitoring and evaluation of the pilot replenishment projects previously funded will provide useful information in developing these criteria.

ESTIMATED COST: $50,000

STATUS: Recently, the Proposition 70 Committee approved $50,000 for DFG to have such criteria developed for the Merced River. The importance of coarse sediment in river functions is well documented. It is also recognized that large gravel deficits exists below the dams on controlled streams, yet regular supplies of clean gravel are needed for healthy biological functions. Pilot gravel replenishment projects are proposed. Appropriate criteria for the volumes, placement and dispersion strategies and replenishment frequencies are needed before large scale and long-term gravel replenishment efforts are initiated. .

PROJECT PROPONENT: DFG and interested parties

PROJECT TITLE: MERCED RIVER WATERSHED ASSESSMENT (#9)

LOCATION: Merced River and effective adjoining watershed

BENEFITS: Provide broad-scale perspective on all habitat improvement and restoration activities planned for the lower Merced River. Help design plans and treatments on the cause of habitat problems rather than the symptoms.

PROJECT DESCRIPTION: Contract with appropriate experts to review and assess the present physical, hydrological and biological functions and help define of the key limiting factors and stressor in the Merced River watershed. Prepare a report providing watershed-level recommendations to help focus habitat restoration efforts.

ESTIMATED COST: $250,000

STATUS: This project is in the conceptual stage at this time.

PROJECT PROPONENT: SJRMP Action Team

PROJECT TITLE: REED CHANNEL RESTORATION PROJECT(#10)

LOCATION: Tuolumne River, upstream of Waterford and below Roberts Ferry Bridge.

BENEFITS: Reduce juvenile and smolt salmon mortality in a stream-captured gravel pit, restore riparian vegetation and floodplain function, and enhance salmon spawning and rearing habitats.

PROJECT DESCRIPTION: See current detailed proposal to the "4-Pumps" Committee.

ESTIMATED COST: $490,000

STATUS: Due to initial investments under the "4-Pumps" program the project design plans and permitting has been or is in the process of completion. The project is scheduled for construction in the summer of 1997 and 1998 if cost-share funding commitments are met. Review of design plans and construction schedule may be necessary following the January, 1997 flood event.

PROJECT PROPONENT: DWR, DFG, CVPIA and Reed Gravel, Inc.

PROJECT TITLE: SPECIAL RUN-POOL PROJECT 9-10 (#11)

LOCATION: Tuolumne River near Waterford

BENEFITS: Restore more natural river configuration and function of floodplain and low flow channel within important nursery and migratory habitat.

PROJECT DESCRIPTION: See detailed proposal from Modesto/Turlock Irrigation District consultants.

ESTIMATED COST: $4,000,000

STATUS: Project design is complete and initial review by responsible agencies has been provide. Permitting, environmental compliance and construction schedules are pending. Funding commitments under the Tuolumne Settlement Agreement and CVPIA are in place. Review of existing design plans may be necessary following the January, 1997 flood event. construction is anticipated within three years.

PROJECT PROPONENT: M/TID, DOI, Tuolumne River Technical Advisory Committee

PROJECT TITLE: SPECIAL RUN-POOL PROJECT 5-6 (#12)

LOCATION: Tuolumne River near Waterford

BENEFITS: Restore more natural river configurations and function of floodplain and low flow channel within important salmon nursery and migratory habitat.

PROJECT DESCRIPTION: See M/TID project proposal

ESTIMATED COST: $4,000,000

STATUS: Preliminary design plans under development. Conceptual plan has been discussed with interested parties. Final design plans, permits, environmental documents and funding commitments are pending. Construction is anticipated within three years.

PROJECT PROPONENT: M/TID

PROJECT TITLE: TUOLUMNE RIVER HATCHERY PLANNING (#13)

LOCATION: Tuolumne River near La Grange, upstream of Highway J59.

BENEFITS: Supplement natural production with careful artificial propagation to help maintain adequate spawning escapement and ensure more consistent use of restored spawning and nursery habitats. Help maintain existing genetic diversity. Help restore and maintain local sport fisheries and the sport and commercial fisheries along the Pacific Coast.

PROJECT DESCRIPTION: A small supplementation hatchery is proposed for the Tuolumne River by DFG and DWR. Salmon migrating up the Tuolumne River would be trapped at two or more sites each fall, and throughout the spawning period. A conservative cap or ceiling on annual production at this facility would be established (e.g. 1.5 million smolts). Egg take would be apportioned, or adjusted, so that gametes from throughout the duration of the run, both up and down river spawners , would be represented in the hatchery production each year. Genetic and other monitoring would be performed on regular intervals and contingency operations will be defined. Auditing and reporting requirement will be established to help ensure the protocols adopted are followed. As natural runs decline we anticipate that hatchery production may decline. As natural runs increase, hatchery production would also increase, but only up to the cap or ceiling level. Careful management, appropriate sizing and necessary features for innovative operation of the facility, and a good monitoring and reporting protocols are anticipated for the preferred alternative.

ESTIMATED COST: $1,000,000

STATUS: The current planning activity is focused on development of the Hatchery Operations Plan, refining cost estimates for several facility features, and exploring options for funding the construction and operation of such a facility. Funding for the next phase of planning will soon be requested through the "4-Pumps" Agreement. Completion of the environmental documents and design plans is anticipated over the next 2+ years. As currently planned, the first year of production for the proposed facility is 2002. A five-member Genetic Review Committee has been established to assist with refinement of the Hatchery Operations Plan, and Stakeholder group meeting are held bi-monthly to provide interested parties with planning updates and receive regular input.

PROJECT PROPONENT: DFG and DWR

PROJECT TITLE: PILOT GRAVEL CLEANING PROJECT (#14)

LOCATION: Tuolumne River near La Grange, below Old La Grange Bridge

BENEFITS: Evaluate changes in adult salmon use and the relative improvement in infiltration rates, dissolved oxygen and survival-to-emergence eggs deposited in a pilot riffle.

PROJECT DESCRIPTION: Construction and testing of a mechanical gravel cleaning device to a) remove fine sediments from spawning substrates Riffle 1A. The detailed project proposal would be reviewed by responsible and trustee agencies and all necessary permits or agreements obtained. Cleaning activities would occur in advance of fall salmon spawning activity. A monitoring program would be implemented to evaluate the benefits of this approach to cleaning gravels, relative to a control(similar untreated sites) nearby. Results would be summarized, evaluated and a brief report prepared summarizing the initial merits of the pilot project and making recommendations for future utility of this method. Longer term monitoring of some parameters would be appropriate to evaluate the longevity of perceived benefits.

ESTIMATED COST: $200,000

STATUS: This project is in the conceptual stage at this time. Preliminary work with this type of gravel cleaning equipment was evaluated in the Tuolumne River in the past on a small scale.

PROJECT PROPONENT: M/TID

PROJECT TITLE: INTERIM ARTIFICIAL PROPAGATION PROGRAM (#15)

LOCATION: Tuolumne River Facility (TRF) near La Grange

BENEFITS: Provide up to 300,000 salmon smolts of Tuolumne River origin for Settlement Agreement Studies on the Tuolumne River, instead of using Merced River Hatchery (MRH) stock. Free up a like amount of production at Merced River Hatchery for priority South Delta, Stanislaus and Merced river study and management programs.

PROJECT DESCRIPTION: Adult salmon returning to spawn in the Tuolumne River would be trapped each fall from 1997 through 2001 (5 years) at up to two sites. Specified mating would occur onsite, and fertilized eggs would be transported to Merced River Hatchery for incubation. Shortly after hatching and emergence, and after feeding begins, the offspring would be returned to the Tuolumne River and reared to smolt size in an unused section of the Modesto Irrigation District main canal. Feeding and regular health inspections would be provided. The fish would be tagged with coded-wire tags or marked prior (at MRH or TRF) to release for study or management purposes.

ESTIMATED COST: $400,000

STATUS: This project is in the conceptual stage at this point. DFG has notified parties interested in obtaining hatchery smolts for study purposes that such a project may be necessary to meet the already large and growing demand for study fish of San Joaquin basin origin. The Herbold/Hanson Plan, evaluations of the Head of Old river Barrier, and studies on the Stanislaus River are examples of this growing demand. Strides on the Merced River are intensifying as well and the demands for smolts for those studies will have priority over others. Prior to the construction and operation of the proposed Tuolumne River Hatchery (2002) this project may prove effective in providing additional hatchery fish for studies. Based on past experience, remote trapping and spawning programs can be marginally successful in some situations. As the proposal develops this spring we can make a better assessment of the probability of success.

PROJECT PROPONENT: DFG and interested parties.

PROJECT TITLE: M.J. RUDDY FLOODPLAIN RESTORATION (#16)

LOCATION: Tuolumne River near Waterford, downstream of Roberts Ferry Bridge.

BENEFITS: Restore more natural channel configuration, floodplain function and low flow channel habitat value. Avoid stream capture of old gravel mining pit adjacent to the active channel. Avoid sluicing of fine sediment into the Tuolumne River and siltation of gravel substrates downstream. Isolate a large backwater area know to absorb heat energy and support higher predator fish densities.

PROJECT DESCRIPTION: Major channel modifications at two sites near the M.J. Ruddy and Sons, Inc. (now Santa Fe Gravel) plant site would be restored. Upstream, a large backwater area would be isolated from the Tuolumne River by fill material, configured to provide reasonable floodplain function, including establishment of riparian vegetation. Downstream of the plant site and on the opposite side of the river, an old mining pit and levee system now perched next to the river would be modified to provide more adequate floodplain capacity and function under high flow conditions. the near-vertical levee would be "laid back" or moved back and a new levee established if necessary to accommodate necessary channel cross-sections at this site. To the extent feasible, salmonid nursery habitat would be restored in these two areas. Work would be performed in two phases, or simultaneous if cost-effectiveness dictates.

ESTIMATED COST: $1,500,000

STATUS: This project is conceptual at this time. A site review is necessary following the January 1997 flood to evaluate the merits of these projects.

PROJECT PROPONENT: DFG and M/TID

PROJECT TITLE: TUOLUMNE RIVER INTERPRETIVE CENTER CONCEPTUAL PLAN (#17)

LOCATION: Tuolumne River Restoration Center, near la Grange.

BENEFITS: Define the scope and a Conceptual Plan for a resources-based interpretive and educational center for Stanislaus County visitors near La Grange. Enhance the diversity of uses and understanding of natural resource values and the importance of historic and future uses. Provide a venue for a multi-agency educational program in a natural setting along the river. Integrate state, federal, local and private interests into a common goal. Compliment the other features of the Tuolumne River Restoration Center.

PROJECT DESCRIPTION: Retain appropriate expertise to prepare a Conceptual Plan, complete with a definition of scope, conceptual design, a listing potential partners and a proposed "road map" beyond the Conceptual Plan to steer interested parties toward implementation. Duties include liaison and coordination with private, local state and federal government and the public to define scope, and graphic artist to depict an acceptable design of needed facilities, definition for the proposed. A steering committee comprised of appropriate parties would be formed and a lead agency selected t manage the contract. The land has already been acquired by the State (DWR), with this purpose identified by DFG over the long term.

ESTIMATED COST: $50,000

STATUS: This project is in the conceptual stage at this time.

PROJECT PROPONENT: DFG

PROJECT TITLE: GASBERG CREEK SEDIMENT CONTROL FEASIBILITY (#18)

LOCATION: Gasberg Creek Watershed, near La Grange

BENEFITS: Reduce fine sediment erosion and discharge into the Tuolumne River near upstream end of the primary salmon spawning areas. Control further deposition of deleterious fine sediment into the designated salmon spawning area.

PROJECT DESCRIPTION: Contract evaluation of the feasibility of a program to reduce erosion and fine sediment loads originating from the Gasberg Creek watershed, and subsequent discharge into the lower Tuolumne River. Prepare a phased project proposal to implement a feasible sediment control program, in cooperation with responsible entities.

ESTIMATED COST: $50,000

STATUS: This project is in the conceptual stage at this time.

PROJECT PROPONENT: M/TID

PROJECT TITLE: WILLMS CHANNEL RESTORATION PROJECT (#19)

LOCATION: Stanislaus River downstream of Knights Ferry

BENEFITS: Restore more natural channel configurations, floodplain and low flow channel function, isolate warmwater predator habitats and restore salmonid spawning and nursery habitat values.

PROJECT DESCRIPTION: See detailed project proposal approved under the "4-Pumps" Agreement

ESTIMATED COST: $1,600,000

STATUS: If the funding commitments under the "4-Pumps" Agreement, CVPIA, and Proposition 70 are met this project will begin construction in FY 1997-98. All design work is completed, and permits and environmental documents have been obtained or are in process. Cost-sharing opportunity may exist.

PROJECT PROPONENT: DFG and DWR, DOI, Proposition 70 Committee

PROJECT TITLE: GRAUPNER CHANNEL RESTORATION PROJECT (#20)

LOCATION: Stanislaus River downstream of Knights Ferry

BENEFITS: See Willms Project benefits.

PROJECT DESCRIPTION: See "4-Pumps" project proposal. Generally similar to the Willms Project but without the predator isolation component and a few site specific features.

ESTIMATED COST: $250,000

STATUS: Planned for final design, permitting and environmental documents under the "4_Pumps" Agreement in FY1998-99. Preliminary design work has been completed. Cost-share opportunity may exist.

PROJECT PROPONENT: DFG and DWR

PROJECT TITLE: GOODWIN CANYON GRAVEL REPLENISHMENT (#21)

LOCATION: Stanislaus River upstream of Knights Ferry, below Goodwin Dam

BENEFITS: Restore useable spawning substrates for salmonids in the canyon reach immediately below Goodwin Dam and at Two-mile Bar. Much of the useable gravel have move out of this reach yet many spawning salmonids move into the area. This gravel will continue to move downstream, thereby provide recruitment in an otherwise "gravel hungry" river section. Tracer rock will be added and monitoring of gravel movement and fish use will occur over the next several years. A summary report will be prepared to assist in future project of this kind.

PROJECT DESCRIPTION: A mixture of desirable gravel will placed in Goodwin Canyon. Due to poor access, a gravel pumping system and hand labor will be need. See detailed project proposal for Salmon Stamp/Proposition 70/CVPIA funding.

ESTIMATED COST: $250,000

STATUS: CVPIA has made preliminary commitments and encumbered funding for this project. Cost-share opportunities may exist.

PROJECT PROPONENT: DFG and DOI

PROJECT TITLE: OAKDALE RECREATION AREA CHANNEL RESTORATION (#22)

LOCATION: Stanislaus River near Oakdale.

BENEFITS: See Ratzlaff Ranch Channel Restoration Project and , Willms Channel Restoration Project. Although the habitat damage at the Ratzlaff site is more extensive the benefits are similar.

PROJECT DESCRIPTION: This is a major channel restoration project that will require large amounts of fill material and equipment time to construct. A detailed description will be provided at the time the funding proposal is prepared.

ESTIMATED COST: $4,000,000 (preliminary)

STATUS: This project is still in the conceptual planning stages.

PROJECT PROPONENT: DFG

E-028959

PROJECT TITLE: TEMPERATURE MANAGEMENT FEASIBILITY STUDY (#23)

LOCATION: New Melones, Tullock and Goodwin Reservoirs and Dams, and the lower Stanislaus River to its confluence with the San Joaquin River. Spicer Meadows Reservoir and Collierville Power Project and possibly the Tri-Dam project features and Sand Bar Projects as well.

BENEFITS: See Temperature Management Feasibility Study for the Merced River. The benefits are similar for natural fish in the Stanislaus River.

PROJECT DESCRIPTION: See Temperature Management Feasibility Study of the Merced River. The work here will be more extensive because there has been less progress under the 1987 Agreement between DFG and USBR in comparison to the work on the Merced River.

ESTIMATED COST: $200,000

STATUS: This project is in the conceptual stage at this time. Although repeatedly recommend to USBR, and more recently to DOI under the CVPIA, funding has not yet been dedicated.

PROJECT PROPONENT: DFG

PROJECT TITLE: COARSE SEDIMENT BUDGET/REPLENISHMENT CRITERIA (#24)

LOCATION: Stanislaus River

BENEFITS: See similar project proposal for the Merced River.

PROJECT DESCRIPTION: See similar project proposal for the Merced River.

ESTIMATED COST: $50,000

STATUS: See similar project proposal for the Merced River.

PROJECT PROPONENT: DFG

PROJECT TITLE: STANISLAUS RIVER WATERSHED ASSESSMENT (#25)

LOCATION: Stanislaus River and effective adjoining watershed.

BENEFITS: See Merced River Watershed Assessment

PROJECT DESCRIPTION: See Merced River Watershed Assessment

ESTIMATED COST: $250,000

STATUS: This project is in the conceptual stage at this time.

PROJECT PROPONENT: SJRMP Action Team

PROJECT TITLE: BANTA CARBONA FISH SCREEN (#26)

LOCATION: San Joaquin River near Vernalis

BENEFITS: Protect rearing and outmigrant salmonids from entrapment or impingement mortality at this 249 cfs diversion.

PROJECT DESCRIPTION: Proceed with final design plan, construction and operation of a "V" screen with bypass located at the mouth of the Banta Carbona Irrigation District inlet canal.

ESTIMATED COST: $4,000,000

STATUS: A feasibility report was prepared and 50% of the funding of this project has been set encumbered under the CVPIA. Some non-federal matching funds have been secured for final design (DFG- $100,000 Proposition 70; $??? Category III). The remaining 50% match required under the Unscreened Diversions Program (CVPIA)
has not yet been identified. A management agreement is being negotiated between DFG and BCID to define respective responsibilities for long term operation, maintenance and repairs of the new screen. An assessment of the impacts of the January 1997 flood at this site is necessary.

PROJECT PROPONENT: DFG, BCID and DOI

PROJECT TITLE: PATTERSON FISH SCREEN FEASIBILITY (#27)

LOCATION: San Joaquin River near Patterson

BENEFITS: Reduce or avoid juvenile salmonid impingement and entrapment mortality at this large riparian diversion from the San Joaquin River.

PROJECT DESCRIPTION: Patterson Water District (PWD) operates a large pump station on the San Joaquin River each year. Contracting for fish screen feasibility analyses would be performed under this project. Alternative screen design suitable for possible installation and operation at this diversion would be identified and evaluated after preliminary survey of the site and review of PWD operational needs. Coordination with the multi-agency Fish Screen Committee will be necessary. A report summarizing the basic features, dimensions and operations of the PWD facility and defining the alternative fish screen design for this site will be prepared (draft and final). A preferred alternative should be recommended.

ESTIMATED COST: $100,000

STATUS: This project is in the conceptual stage at this time.

PROJECT PROPONENT: DFG

PROJECT TITLE: HILLS FERRY SITE ACQUISITION (#28)

LOCATION: Confluence of the Merced and San Joaquin rivers.

BENEFITS: Secure the long term use of this site for the Hills Ferry Salmon Barrier to continue effective control of straying and reproductive losses above the Merced River confluence.

PROJECT DESCRIPTION: Wildlife Conservation Board has proceed on DFG's behalf to acquire this 10 acre parcel on the San Joaquin River. It is strategic in that the orientation of the annual migration barrier at this site has control undesirable straying of adult salmon. Placement of the barrier is subject to current landowner agreement on a year to year basis and "rent" is paid each year. The appraised value of the parcel was far less (approx. $60,000) the asking price. Under those conditions WCB cannot acquire the parcel. However, if another entity interested in the continuation of an effective fall barrier at this site could contribute the differential between a reasonable asking price and the appraised value then WCB could proceed to acquire the parcel. Partial funding is available now under a "4-Pumps" project.

ESTIMATED COST: $60,000

STATUS: Pending resolution of funding differential, DFG negotiates access to the site on a year to year basis.

PROJECT PROPONENT: DFG and DWR

E-028965

PROJECT TITLE: EL SOLYO AND WEST STANISLAUS FISH SCREEN (#29) FEASIBILITY

LOCATION: San Joaquin River near Highway 132 Bridge

BENEFITS: Reduce or avoid juvenile salmonid impingement and entrapment mortality at these two riparian diversions from the lower San Joaquin river.

PROJECT DESCRIPTION: See Patterson Fish Screen Feasibility Project

ESTIMATED COST: $150,000

STATUS: This project is in the conceptual stage at this time.

PROJECT PROPONENT: DFG

PROJECT TITLE: REAL-TIME WQ MONITORING NETWORK (#30)

LOCATION: Lower San Joaquin River

BENEFITS: Improved understanding of system operations and real-time management of drainage to help meet water quality objectives.

PROJECT DESCRIPTION: See Real-time Water Quality Project Proposal and federal grant application.

ESTIMATED COST: $300,000

STATUS: The program is now operating at several key sites and the establishment and maintenance of additional telemetered monitoring sites would further enhance the utility of this water and water quality management effort. See DWR San Joaquin District.

PROJECT PROPONENT: DWR, SJRMP Action Team

PROJECT TITLE: RESOURCES EDUCATION PROGRAM (#31)

LOCATION: San Joaquin Basin

BENEFITS: A more informed public that understands resource management issue

PROJECT DESCRIPTION: Integration and active implementation of Project Wild, Adopt a Watershed, Salmonids In The Classroom and many other programs throughout the San Joaquin Basin for grades K-12.

ESTIMATED COST: $200,000

STATUS: This project is in the conceptual stage at this time.

PROJECT PROPONENT: DFG

PROJECT TITLE: HATCHERY FISH MARKING PROGRAM (#32)

LOCATION: Merced River Hatchery and Tuolumne River Facility

BENEFITS: Distinctive external identification of hatchery origin fish allows for selective harvest in inland waters, estimates of hatchery contributions rates (sport, commercial, escapements, survival rate indices etc.) and clarifies evaluations of the benefits of restoration measures to natural production. Distinctive marks may also assist in specific mating strategies at basin hatcheries.

PROJECT DESCRIPTION: Purchase five (5) new Mark IV Coded-wire Tagging Machines, a heated tagging trailer, necessary replacement parts and supplies for use in the San Joaquin basin.

ESTIMATED COST: $130,000

STATUS: A proposal was prepared by DFG and submitted to several parties this winter while the opportunity for a substantial savings ($25,000 rebate offer) existed. That window of opportunity has now passed. Some other mechanism will now be required to meet the large and growing Delta tagging requests for spring 1997. Beyond 1997, upgrading existing DFG tagging equipment in conjunction with other service DFG provides when spearheading tagging efforts make this a cost-effective approach.

PROJECT PROPONENT: DFG

PROJECT TITLE: SMALL DIVERSION FISH SCREEN REPLACEMENT PROJECT (#33)

LOCATION: Nursery areas in the Merced, Tuolumne and Stanislaus rivers.

BENEFITS: Reduce or avoid juvenile salmonid impingement and entrapment mortality small pump riparian diversion in the designated salmon spawning areas.

PROJECT DESCRIPTION: In conjunction with the operation of DFG's San Joaquin Basin Habitat Shop and crew, a mechanism to provide funding to purchase, install and maintain off-the-shelf type fish screens on priority diversion is proposed. A survey is near completion documenting the locations, size and characteristics of all such diversions in the basin. The next phase of this work will identify priority diversions needing screens. Contacts and agreements with appropriate diverters will be pursued if funding is available. This process would be much more cost effective (less administrative time) on a basin-wide scale rather than seeking funding for each small screens on a project by project basis. A regular program providing DFG access to funds ($500,000 over fiver years) for acquisition, maintenance, repair or replacement of these screen would help facilitate this proactive program. DFG staff would be assigned to check the screens regularly and work with the landowners pursuant to DFG authorities and policies. Longer term funding to maintain and replace these unit would be necessary.

ESTIMATED COST: $500,000

STATUS: This project is in the conceptual stage at this time.

PROJECT PROPONENT: DFG

PROJECT TITLE: ADULT SALMON COUNTING STRUCTURES (#34)

LOCATION: Lower Stanislaus, Tuolumne and Merced rivers

BENEFITS: More accurate indices of adult salmon abundance

PROJECT DESCRIPTION: Installation, operation and removal of counting weirs on the three San Joaquin tributaries may provide more accurate information on spawning escapements that current methodologies. Some field sampling of carcasses and redd distribution would need to continue in addition to the proposed new effort with weir counts. There may also be a period where weir counts and mark-recapture estimates of escapement would both be performed to ensure the historical data will remain useful.

ESTIMATED COST: $300,000

STATUS: This proposal is in the conceptual phase at this time.

PROJECT PROPONENT: M/TID

E-028971

PROJECT TITLE: IMPROVING STANISLAUS RIVER ESCAPEMENT MONITORING-FEASIBILITY OF USING HYDROACOUSTICS (#34b)

LOCATION: A hydroacoustic station will be tested in the Stanislaus River downstream of Riverbank to count adult fall-run chinook salmon.

BENEFITS: Monitoring when adult salmon return to the Stanislaus River to spawn, the age and sex of returning fish, and the total number that return provides a valuable means of evaluating the success of restoration efforts. The current DFG carcass surveys provide these data, but the accuracy of those estimates is uncertain, particularly for years when fall flows are high and boating is difficult. This project would test the feasibility of using hydroacoustic methods in conjunction with the DFG carcass surveys to provide accurate escapement estimates during all flows. DFG surveys would still be required to provide data on spawning distribution and the sex and age of spawners. The hydroacoustic methods may provide a cost effective alternative to installing counting weirs, which may not be effective at all flows.

PROJECT DESCRIPTION: This project would be conducted in two phases. The first phase would require a one week effort in October while spawning-level flows are released to locate a hydraulically suitable site for hydroacoustic monitoring. If a suitable site is located during the first phase, the second phase would compare hydroacoustic counts, visual counts, and the DFG escapement estimate. Hydroacoustic counts would be made during the entire migration period (October 25 to December 24). To verify the hydroacoustic counts, visual counts of at least 50 fish will be made at a nearby riffle. If necessary, a temporary weir will be installed to provide accurate visual counts in an area adjacent to the hydroacoustic station. The Phase II report would discuss whether the DFG carcass surveys are adequate, and if not, whether combined hydroacoustic counts and carcass surveys would be sufficient.

ESTIMATED COST: Phase I costs are $20,000. Phase II costs are $160,000, if a temporary counting weir is not needed. If a weir is necessary, then Phase II costs would increase by $50,000.

STATUS: This project could be implemented in 1997.

PROJECT PROPONENTS: The Stockton East Water District.

PROJECT TITLE: BASSO BRIDGE RIPARIAN ACQUISITION/MGT/EDUCATION PROJECT (#35)

PROBLEM ADDRESSED: See Land Acquisition Evaluation (LAE)

BENEFITS: See LAE

PROJECT DESCRIPTION: See LAE

ESTIMATED COSTS: $350,000

STATUS: Final rating by the DFG Lands Committee and the DFG Leadership Team pending. Following this and the identification of funding for real estate activities and purchase, this project can proceed. Discussion with Stanislaus County is underway regarding compatible management of in-holdings and County properties. Early indications are positive.

PROJECT PROPONENT: DFG

PROJECT TITLE: SPAWNING GRAVEL INTRODUCTION, TUOLUMNE RIVER NEAR LAGRANGE (#36)

Project Location: Tuolumne River, from Old LaGrange Bridge (river mile 50.5) downstream to the New LaGrange Bridge (river mile 49.9), approximately 29 miles east of Modesto near LaGrange (LaGrange quadrangle).

Problem Addressed: Construction of LaGrange Dam in 1893 at river mile 52 permanently ended coarse sediment supply (gravels/cobbles) from the Tuolumne River watershed upstream of the town of LaGrange. Because the few tributaries entering the Tuolumne River downstream of LaGrange contribute virtually no coarse sediment, sediment transported during high flows has been obtained from the bed itself and limited floodplain deposits (dredger tailings). Further reduction in flood event magnitude, duration, and frequency after completion of New Don Pedro Dam in 1969 eliminated recruitment of floodplain deposits. Gravels and cobbles form the bed and banks of the stream, which is the habitat used by salmonids and other species. Elimination of upstream supply has caused channel incision in some locations, and bed particle coarsening in the primary spawning reach near LaGrange. Not only has this condition degraded salmonid habitat, but reduced the volume and extent of gravel deposits. Furthermore, a sand pit located in the lower portion of the Gasburg Creek watershed contributes a considerable quantity of fine sediment (sand) into the Tuolumne River near LaGrange, which has significantly reduced the quality of spawning habitat. In summary, the coarse sediment supply critical for salmonid habitat has been eliminated, and the fine sediment supply that is damaging to salmonid habitat has increased (relative to mainstem flows).

Project Description: We propose to restore a coarse sediment supply to the Tuolumne River below LaGrange Dam by artificially placing clean gravels into the stream between the Old and New LaGrange bridges. These gravels will be slightly smaller than the gravels on the currently paved bed surface such that the contemporary flow regime can transport these gravels and salmonids can better utilize them. This project assumes particle mobility, and we plan/depend on particles mobilizing, depositing as bars and spawning deposits, remobilizing, and redepositing over time. Routing these gravels downstream will provide a long project life span. The source of gravel is the sand pit adjacent to the proposed introduction site, which has been accumulating gravels as a byproduct of the sand extraction. Because this sand pit contributes to the fine sediment load in the Tuolumne River, it is further proposed as part of this project that the sand pit be regraded so that surface runoff from the sand pit flows into a sedimentation pond rather than into Gasburg Creek and the Tuolumne River.

Benefits: A majority of salmonid spawning and rearing in the Tuolumne River occurs in this reach; therefore, restoring a clean coarse bedload source will not only improve existing spawning/rearing habitat, it will increase the size and extent of habitat features. Restoring a bedload supply will encourage point bars and in-channel bar features to form, increasing channel and habitat complexity. We propose to introduce gravels at a rate equal to that of mainstem transport, so that the coarse sediment balance is restored.

Estimated Costs: The majority of costs will be the purchase, screening, and transportation/placement of these gravels, which depends on the volume of gravels needed. Because the mainstem transport varies from year to year, the gravel introduction volume will vary accordingly. Mainstem transport rates as a function of discharge, and then as a function of each year from 1970-96 is being computed, and is not yet complete. Assuming that a long-term average of 10,000 tons (approx. 6,200 yd^3) of gravel are introduced per year (a conservatively large estimate), the yearly cost would be approximately $90,000 per year. Add $15,000 for first year permitting costs, and $50,000 for regrading the sand pit.

Status: Owner of source material has been contacted and has provided cost estimate for supplying gravel. Volume of gravel on site will be quantified to determine life span of gravel source. Mainstem Tuolumne River gravel transport rates are being computed to estimate yearly introduction needs (introduction=transport). No environmental documentation has occurred to date.

Project Proponent: Tuolumne River Technical Advisory Committee (Don Pedro Project, FERC License No. 2299), participants include: Bay Area Water Users Association, California Department of Fish and Game, City and County of San Francisco, Friends of the Tuolumne Trust, Modesto Irrigation District, Tuolumne River Preservation Trust, Turlock Irrigation District, US Fish and Wildlife Service.

PROJECT TITLE: TUOLUMNE RIVER FLOW ENHANCEMENT FEASIBILITY STUDY (#37)

PROJECT LOCATION: Tuolumne River from La Grange Powerhouse (river mile 52) downstream to a diversion between river miles 19 and 27.

PROBLEM ADDRESSED: The project is to review the feasibility of providing supplemental flows in a portion of the Tuolumne River through deliveries of Turlock Irrigation District water to a proposed domestic water treatment plant and partial deliveries to meet irrigation needs. These flows would supplement the releases already ordered by FERC in 1996. Water for these purposes would normally be diverted into the Turlock Irrigation District Upper Main Canal at La Grange.

PROJECT DESCRIPTION: The project would be a feasibility study for providing supplemental La Grange instream flows with a diversion system having the following components:

1. A channel, or other type of diversion, from the main stem of the river to the proposed pumping plant,
2. A screened pump intake structure,
3. A pumping plant with separate pumps delivering water to both the domestic water plant and the Ceres Main Canal,
4. Flow monitoring for the pumping plant,
5. Develop long term O & M cost projections to determine potential incentive price structure.

BENEFITS: The principle benefit of the project is to provide additional flows in the upper reach of the Tuolumne River during the summer months of below average runoff years. The domestic water flows are estimated to be up to 25 cfs year round. The irrigation flows could range from 25 cfs to 100 cfs, depending on costs. This would provide up to 125 cfs of additional water in the river between La Grange and the diversion site.

ESTIMATED COSTS: The feasibility study is estimated to cost $100,000.

STATUS: This is the first step in complying with Section 11 paragraphs 5 and 6 in the Don Pedro FERC Settlement Agreement.

PROJECT PROPONENT: The Tuolumne River Technical Advisory Committee (Don Pedro Project, FERC License No. 2299); participants include: Turlock Irrigation District, Modesto Irrigation District, California Department of Fish and Game, City and County of San Francisco, and U.S. Fish and Wildlife Service.

PROJECT DESCRIPTION: TUOLUMNE RIVER ENVIRONMENTAL EDUCATION CENTER (#38)

Project Location - LaGrange, Stanislaus County

Problem Addressed: The Tuolumne River Environmental Education Center will be designed to address fisheries (both commercial and angling), fish and wildlife, agriculture, habitats, water, electrical power and people. The general public awareness and understanding of the necessity for an ecosystem approach to water, fish and wildlife management and the values of those issues to overall quality of human life and the economy need to be enhanced. Overall public support for environmental protection and the maintenance of environmental quality will be improved only through education and understanding. This environmental education center can address many of the interrelated environmental issues of the San Joaquin River watershed, including salmon genetics, ecosystems, watershed management, water, power agriculture and human social and economic issues and challenges. Business is no longer as usual. A healthy business depends upon a healthy environment and a healthy environment depends upon a healthy economy.

The most efficient and cost effective way to minimize environmental damages is to prevent them initially. High quality environmental values and the financial and intellectual support to maintain them can only come from an educated public. Many of the issues we face today in the Sacramento and San Joaquin River watersheds, Bay-Delta, and other regional watersheds, may be resolved or improved with an elevated public understanding and awareness. An integrated environmental education program, of which this project would be part, is necessary to help accomplish that goal.

Benefits: This environmental education project is related to the San Joaquin River Parkway Plan; the Tuolumne River Regional Park Plan; Bear Creek Conservation and Trust Grassland Environmental Education Center; Knights Ferry Visitor Center; Great Valley Museum; Coles Levee Ecosystem Preserve Environmental Education Center, and the San Joaquin River Management Program (SJRMP) Education Program.

Benefits from an environmental education program are difficult to quantify. However, environmental education is basic to understanding of the human environment and its interrelationships. Environmental education can result in less environmental damage, less habitat degradation from fires, littering, solid waste disposal, fewer angling and poaching violations, increased volunteerism for riparian habitat and fish and wildlife enhancement projects, and financial support for those types of projects. Environmental education increases the number of land use improvements and habitat enhancement projects along riparian corridors, as evidenced by CRMP, the Coordinator Resource Management Programs being implemented along a number of California streams. These programs are being developed largely as the result of self-education at the local level.

Project Description: The Tuolumne River Environmental Education Center at LaGrange is to be located on the site of the Tuolumne River fish hatchery. This center is to be central to the development of an overall environmental education and outreach program for the tributaries of the San Joaquin River and will be integrated with the San Joaquin River Program yet to be developed under SJRMP. The project will be phased into four parts: Phase I, Land Acquisition; Phase II, the development of a Master Site Plan with public input, Construction (Phase III) and operations (Phase IV).

The environmental education enter would serve both local publics as well as include a public outreach program which could be integrated with education activities on both the main-stream San Joaquin River and other tributaries.

Development of the Master Plan in Phase II is intended to include:

(a) Public use
(b) Natural resource values
(c) Economic values
(d) Natural trail design
(e) Interpretive exhibits/buildings
(f) Parking and access - included for the physically challenged
(g) Picnic area

(h) Native American Indian display
(i) Habitat restoration, as necessary around the facilities.

Phase II also includes the intermediate and final phases of the environmental documentation. Phase III would be the construction phase under contract and Phase IV, the operating Phase. Although to be operated under the auspices of the California Department of Fish and Game, the Center may actually be operated by a contractor or a locally established natural history association. Volunteers and others would plan to be used in the operations of the facility on a daily basis.

Estimated Costs: Potential cost-share partners could include the U.S. Bureau of Reclamation, the U.S. Fish and Wildlife Service, the Turlock Irrigation District and the Tuolumne River Conservancy or other similar grass-roots public non-profit support group (yet to be established?). Estimated costs, time frames and status are shown in Part VI below.

Status: The land acquisition has been completed. About 3.6 acres were purchased which includes area for the development of a hatchery. The environmental documentation can either be integrated with that being developed for the fish hatchery or can be handled separately. Public meetings on the hatchery have already been initiated. Likely, however, the simplest approach would be the development of a concurrent process for the education center, which is not dependent upon the timing of the hatchery plans, approval, or construction. Although related to the hatchery and artificial fish production, the environmental education center can be a stand alone project. The expense of the project depends upon the development of the Master Plan and overall funding availability. Interpretive buildings could either be constructed, or modular construction could be used instead, which would be less expensive, although perhaps not as durable.

Phase	Activity	Time (Months)	Cost ($)
Phase I	Land Acquisition	Completed	
Phase II	Master Plan	6	35K
	Environmental Documentation	12	20K
Phase III	Construction: Interpretive Center Gazebo Nature Trail	14	 75K 15K 8K
Phase IV	Operations/maintenance	Ongoing	40K/yr.

Project Proponent: California Department of Fish and Game, 1234 East Shaw Avenue,Fresno, CA 93710.
Contact: Rhonda Reed or Bill Loudermilk
Phone No.: 209-243-4017 or 209-222-3761, respectively

PROJECT TITLE: RIPARIAN HABITAT RESTORATION, TUOLUMNE RIVER NEAR LAGRANGE (#39)

LOCATION: Tuolumne River, from New LaGrange Bridge (river mile 49.9) downstream to Old Basso Bridge (river mile 47.4), approximately 29 miles east of Modesto near LaGrange (USGS "LaGrange" quadrangle).

PROBLEM ADDRESSED: Extensive (valley wall to valley wall) gold dredging occurred until 1937, leaving no defined channel and voluminous piles of dredger tailings (as shown on 1937 aerial photos). Flood events after 1937 began reforming a defined channel through the tailings, but by 1963 the channel still lacked defined floodplains and meander sequences. Then, during construction of New Don Pedro Dam from 1965 to 1969, the dredger tailings were removed, leaving shallow ponds and uneven surfaces. Shortly after completion of the dam, the river channel from river mile 50.5 to 46.6 was reconstructed to optimize spawning habitat. However, the riparian community was not restored, and limited natural recruitment has occurred over the years. Since 1972, the project site has been extensively grazed, preventing natural recruitment of valley oak and cottonwoods. White alder and narrow leaf willow, however, have encroached on the channel and point bars. This land use legacy has resulted in fragmented riparian stands, poor to non-existent valley oak regeneration, and shallow ponds that often strand salmonids during receding high flow events.

PROJECT DESCRIPTION: We propose the following:

1. Recreate functional floodplains and terraces that are inundated during appropriate post-dam floods
2. Resurface floodplains and terraces with finer sediments conducive to riparian initiation
3. Reestablishing cottonwood communities on floodplain surfaces and valley oak communities on terrace surfaces
4. Regrade floodplain and terrace surfaces to reduce salmonid fry stranding
5. Create high flow channels within the active channel to increase salmonid habitat diversity.

BENEFITS: Because a majority of salmonid spawning and rearing in the Tuolumne River occurs in this reach, filling/regrading shallow ponds on floodplain surfaces will reduce fry and juvenile salmonid stranding on the receding limb of high flow events. Reestablishing functional floodplains, and eliminating grazing on restored surfaces, will restore natural riparian woody plant initiation, which will increase the structural, age, and species diversity of the riparian community. The mature valley oak and cottonwood communities were historically responsible for providing much of the large woody debris input into the channel, providing direct (cover) and indirect (particle sorting for spawning and rearing) habitat for salmonids. Since the mature (pre-dam) oaks and cottonwoods are limited in the reach, restoring these communities will provide future woody debris input and will increase riparian vegetation structural diversity. Greater canopy structural diversity will increase perch availability for Blue Heron, Great Egrets, Osprey, and Bald Eagles. Restoration of larger cottonwood and valley oak stands (> 10 acres) will also serve to create beneficial microclimatic conditions (cooler temperatures and higher humidity) for small mammals and amphibians.

ESTIMATED COST: Engineering, environmental documentation/permitting, construction, revegetation, plant stock, and monitoring (for 5 years) costs are approximately $275,000. Cost sharing is being pursued.

STATUS: A rough draft of the restoration design will be completed by 25 January 1997. Complete engineering design and survey work will be completed by October 1997, pending funding. The implementation of the design including construction, revegetation and monitoring will begin in June of 1998. No environmental documentation has occurred to date.

PROJECT PROPONENT: Tuolumne River Technical Advisory Committee (Don Pedro Project, FERC License No. 2299), participants include: Bay Area Water Users Association, California Department of Fish and Game, City and County of San Francisco, Friends of the Tuolumne Trust, Modesto Irrigation District, Tuolumne River Preservation Trust, Turlock Irrigation District, US Fish and Wildlife Service.

PROJECT TITLE: LOWER STANISLAUS RIVER TEMPERATURE MANAGEMENT FEASIBILITY STUDY (#40)

LOCATION: New Melones, Tulloch, and Goodwin reservoirs, and lower Stanislaus River to its confluence with San Joaquin River. Evaluations of the temperature effects of upstream projects and facilities (including Spicer Meadows Reservoir, Collierville Power Project, Angels-Utica Project, and Sand Bar Project) on the thermal regime of the lower Stanislaus River should be addressed as a separate feasibility study once the lower basin temperature management feasibility studies are completed. Integration of the results of any temperature model into a detailed salmon mortality model may also be contemplated as a future project once the feasibility studies have been completed.

BENEFITS: This project will provide information on the potential for improving natural habitat conditions for anadromous salmonids at critical periods of their riverine existence in a greater frequency of years. Improved spawning and incubation temperatures in the fall, as well as improved rearing temperatures in the spring and early summer of some years may be feasible by manipulating New Melones, Tulloch and Goodwin releases.

PROJECT DESCRIPTION: A daily reservoir model and a daily riverine temperature model will be applied to the lower Stanislaus River basin. This feasibility study should include two years of complete water temperature data from the three reservoirs and several lower river locations as well as site specific meteorological conditions over the same time period. These data will be used to calibrate separate reservoir and river temperature models for year round use. Model outputs will be integrated to allow prediction of daily reservoir release temperatures and daily stream temperatures in the lower Stanislaus River under a variety of simulated hydrologic, meteorologic, and New Melones Reservoir elevation conditions. These simulation conditions will need to be specified (or at least estimated) by intested resource agencies prior to initiation of any studies. Based upon these predicted temperature simulations, the feasibility of controlling lower Stanislaus River temperatures through the operation of the upstream dams will be determined. The resulting benefits/costs of any management actions can then be assessed by the interested parties.

ESTIMATED COST: $250,000

STATUS: The United States Bureau of Reclamation has completed a monthly temperature simulation that was based upon limited calibration data collection. The ability of this model to adequately predict even weekly temperature regimes on a year round basis has been questioned. While this USBR model remains the best available information for predicting stream temperatures in the lower Stanislaus River, a fully verified and reliable, daily, year round temperature model is preferred.

PROJECT PROPONENT: California Department of Fish and Game

PROJECT TITLE: EVALUATION OF ARCHIVED SCALE AND OTOLITH SAMPLES COLLECTED DURING FALL CHINOOK SALMON CARCASS SURVEYS ON SAN JOAQUIN TRIBUTARIES (#41)

LOCATION: Stanislaus, Tuolumne, and Merced River basins.

BENEFITS: This project will yield information on the age structure of past San Joaquin tributary fall chinook salmon spawning populations. This information could then be used to perform more precise cohort analyses for each of the basins. This project will not involve any field work or collection of any new samples, but will rely solely on the laboratory inspection and analysis of previously collected, but unexamined, biological materials.

PROJECT DESCRIPTION: The California Department of Fish and Game has been estimating spawning escapements for the San Joaquin River tributaries annually since 1951. Scale samples have been collected from chinook salmon carcasses during these surveys at least since 1976. Between the fall 1976 and 1990 surveys about 2100 scale samples were collected from the San Joaquin tributaries (Table 1). Additional (but unquantified) numbers of scales have been collected through the recently completed fall 1996 escapement surveys. Otoliths samples have been collected from some chinook salmon carcasses in all three tributaries since 1994. Scales samples collected prior to 1976 may exist and should be included for examination under this project.

Table 1. San Joaquin basin fall-run chinook salmon scale samples, 1976-1996 (from DFG)

Year	Stanislaus River	Tuolumne River	Merced River
1976	0	0	41
1981	0	140	31
1982	0	40	0
1983	4	52	20
1984	0	57	0
1985	8	77	3
1986	0	65	0
1987	159	85	8
1988	239	66	38
1989	481	365	100
1990	17	31	13
1991	0	?	?
1992	0	?	?
1993	?	?	?
1994*	?	?	?
1995*	?	?	?
1996*	?	?	?

* otoliths collected

This project will initially involve locating the archived materials and cataloging individual samples (including sample date, sample location, size of fish from which sample was collected). Samples will then be prepared and examined using available computer hardware and pattern-analysis software. Scale circuli patterns (or ring patterns in otoliths) will be used to yield an age estimate for each sample examined. Collectively, samples from a given year and basin should yield estimates for the age structure for that particular spawning escapement of chinook salmon. All results will be tabulated and presented in a final report. Depending on the amount of material available for examination, it is expected that this project will take 12 to 18 months to complete.

ESTIMATED COST: $45,000

STATUS: The scale, and more recently otolith, samples have been routinely collected from salmon carcasses during annual fall spawning surveys in each of the tributaries. Most of this material has been archived by the Department pending funding for future examination.

PROJECT PROPONENT: California Department of Fish and Game

PROJECT TITLE: STANISLAUS WATERSHED PROJECTS TO IMPROVE WATER QUALITY FOR FISHERIES - PROPOSAL FOR FUNDING OF THE EAST STANISLAUS RCD, STANISLAUS COUNTY (#42)

Location: Stanislaus Basin Watershed, Stanislaus County

Problem Addressed: Poor quality water runoff from ranch and farm land has negative impacts on salmon fisheries in numerous rivers and streams. Sands and fines clog gravel beds and can bury and smother salmon eggs. Sediment load negatively affects that shape and character of river stream channels and decreases the quality of in-stream habitat for salmon fry and smolts. When the weather is warmer, fine sediments add to the increase in water temperature because it allows more heat absorption from sunlight. Fishery studies to date indicate that poor quality water hurts salmon eggs and young in the Stanislaus River. Though the impacts are not statistically identified, decreases in water quality as measured in dissolved oxygen, temperature and toxic chemicals may be a major factor in the demise of smolts and fry living in and migrating from the river. Gaining additional knowledge on how on-farm/ranch management practices and infrastructure in the ESRCD can improve the quality of the water that enters the Stanislaus River can be beneficial to similar watersheds around the state.

Project Description: The East Stanislaus Resource Conservation District (ESRCD) seeks assistance in boosting farming and ranching practices that improve the quality of water running off of Stanislaus watershed lands. During the first 2-3 months of the project, a professional facilitator will help the stakeholders clarify and prioritize goals, strategies and objectives, and develop a two year work plan. Based on this, the ESRCD will contract a resource conservation specialist who will help develop evaluative procedures and criteria for selecting pilot projects, developing the monitoring program and writing documentation and analysis. In addition this person would work with the RCD and NRCS to respond to funding opportunities that would help spread these and other successful projects. On-farm/ranch pilot projects which would be considered for funding include but are not limited to: sediment retention basins, vegetative filters, tail water return systems, dormant spray reduction practices, habitat restoration and grazing management improvements. Pilot projects will incorporate different levels of monitoring to evaluate the replicability and success of the different practices. Monitoring, professional facilitation and other components may be contracted to consultants and universities.

Benefits: An initial investment in a planning, pilot project and monitoring program for the ESRCD can provide synergistic benefits for water quality in the Stanislaus. A number of USDA, USEPA and other programs such as the Environmental Quality Incentive Program are authorized to provide cost sharing and other funds to the area but cannot be accessed without this type of project being done. Because much of the sediments and chemicals entering the Stanislaus River comes from ranch and farm runoff, changes in practices which improve their runoff could, over time, significantly improve the quality of the water for Stanislaus fisheries. In addition, these pilot projects will provide important information for other RCDs which have similar problems as they provide the ESRCD with guidance for future work.

Estimated Costs: The proposed costs will be divided between planning, logistics, monitoring, and pilot projects not funded by other programs. $20,000 would pay for the process facilitator for the three year effort and for the logistical work to set the project up. $135,000 would pay for three years of a resource conservationist to provide technical help, project supervision, accounting, reporting, and grant writing. $20,000 for two years of informational support including: copying, printing, Internet distribution support, mail, phone, technology training, and meetings, $350,000 would be available for pilot project implementation. A final $50,000 would be used for the initial baseline monitoring and three years of follow up monitoring and reports.

Status: The East Stanislaus County RCD voted to support this project at its February 5 meeting and is committed to implementing it as soon as funding is approved.
Project Proponents: East Stanislaus RCD

PROJECT TITLE: STANISLAUS RIVER TEMPERATURE MODELING AND REAL TIME OPERATION DEVELOPMENT (#43)

Project Location: New Melones, Tullock and Goodwin reservoirs and the mainstem Stanislaus River downstream.

Problem Addressed: Experience gained during the last drought showed that when the New Melones reservoir drops to a level near the elevation of the power outlets and the top of the Old Melones dam, the temperature of the released water can be too warm for salmon egg survival and might also contribute to temperature related problems of fry and smolt. One option being considered in the long-term operations of the New Melones dam is a more risk assuming, conjunctive use focused, operational model whereby reservoir levels statistically drop to this critical level and below more often. Changing operations in this manner will result in less reservoir flood spills. This will help fisheries because spills that occur before smolt outmigration can harm salmon fry and eggs. In addition, fewer spills equate to an increase in annual yield (preliminary estimates are at least 30,000 acre feet annually) which means more water will be available for all project purposes. If the temperature problem at New Melones is not addressed, this management option cannot be properly considered.

Project Description: Developing an operational method that ensures critical fishery temperature needs can be met in the Stanislaus River requires four separate but integrated projects.

A temperature model for the river below Goodwin dam that accurately predicts how reservoir outflows and temperature can be best integrated to improve in-stream temperatures as the water flows toward its confluence with the San Joaquin. This model would account for air, groundwater and surface water inflow temperatures at key points along the river. Ideally the integration of stream and reservoir temperatures with the biology of the fishery as modeled in the IFIM (PHabSim) would lead to the creation of a useful real-time monitoring program similar and possibly integrated into the agencies' successful water quality real-time monitoring program. Thus a river temperature model on the Stanislaus could become an important restoration management tool in its own right. To make this project an truly useful tool, an analysis will need to be done on the existing monitoring stations and the information they provide. For example, one gauge is within two miles of a major water district return flow site which causes artificially large fluctions in river temperatures downstream.

A reservoir operations temperature model that works in coordination with the river temperature model. The Bureau of Reclamation learned a great deal during the last drought on how operations of New Melones at a critically low level affected downstream river temperatures. For example, they calculated the value of lowering downstream Tullock and Goodwin reservoirs so that the water flowed through them more quickly, and thus at a colder temperature to the river below. The existing USBR modeling work along with additional data and the river temperature model need to be used to fully determine how best to operate New Melones for the most efficient means of meeting downstream water temperature needs. This would be critical to the development of real-time monitoring and operations as a restoration tool.

The integration of the two models and an analysis of the value of real time monitoring. If the integration of the two models is done correctly, whenever real time modeling detects a problem, the models can help identify the cause and the best solution to fix it. The cost of real timemonitoring is mostly dependent on the cost of collecting the data from the stations along the river and the improvement of monitoring in general along the river. The majority of the initial costs are investments in the information infrastructure - computer programming, webpage development and monitoring station remote sending hardware. The ongoing costs of web page maintenance and modeling adjustments are minor and can be incorporated into job descriptions of existing personnel.

Feasibility studies into the most cost-effective alternatives to rectify the problem of the Old Melones dam and the high elevation power house intake. A number of long term solutions have been proposed. Determine the total b.t.u.s that would need to be removed via in-river refrigeration units to get the right temperature of water in each of the different model runs. Blow a notch in Old Melones dam so that the reverse temperature curtain effect is eliminated. Put a siphon from the cold side over the old dam directly into the outlet tubes at the base of New Melones. The value of all the different alternatives will be easier to interpret with the solid base of modeling done in steps 1-3. From this information initial costs estimates could be made on these different alternatives. What is eventually needed is a full-feasibility study on a preferred alternative.

Benefits: The completion of these four projects will:

Develop a temperature model for the river and the dam that assists in a reservoir operational plan that makes the most efficient use of water to meet the temperature needs of anadromous fish.

Lead to the development of a preferred alternative for any infrastructure changes needed by the long term solution to the problems of low reservoir levels and fishery temperature needs.

Solve the problem that not completing these models creates for fully evaluating an EIS/EIR alternative that maximizes the goals of spill avoidance, conjunctive-use and fishery protection for New Melones operations.

Estimated Costs:

River Temperature Model: $150,000
Reservoir Temperature Model: $200,000
Integration Modeling: $100,000
Feasibility Study: $100,000
Process facilitation and logistics*: $15,000
(*a committee of the Stanislaus Basin Stakeholders)

Status: Consensus on the importance of temperature modeling has been reached by the stakeholders. Details have not been worked out but could be quickly if funding was possible.

Project Proponent: The Stanislaus Basin Stakeholders

PROJECT TITLE: STANISLAUS CHANNEL AND FLOOD PLAIN MAINTENANCE POLICY AND PLANNING (#44)

LOCATION: Stanislaus River from Goodwin Dam to the San Joaquin

PROBLEM ADDRESSED: The fishery biologists at the January 16-17 CalFed sponsored workshop agreed that the quality of the Stanislaus River channel and flood plain has an impact on the survival of salmon eggs, fry and smolt. The Army Corps of Engineers has a mandate to make recreation, and flood protection along with habitat restoration priority goals for the Stanislaus channel and flood plain. The actions taken to achieve one of these goals can have negative impacts on the other goals. For example, structural changes to spawning areas whether through gravel and boulder placement or bulldozer manipulation may benefit the fishery but impose problems for recreation. Restricting the river channel may benefit flood protection but hurt juvenile rearing habitat. Woody debris in the river can provide additional habitat but can also be a navigational hazard. Even the methods for riparian vegetation restoration can be controversial depending on chemical usage and its impacts on the water quality for juveniles, especially when they are in the near shore environment during spraying times. Each of these issues can have significant impact on spawning beds, fry and smolt rearing habitat, outmigration success, predator prevention, water temperature and water quality. Developing interest-based solutions to these problems would likely lead to greater consensus on restoration projects, policy development, and a long term vision of the river.

PROJECT DESCRIPTION: Pursue a stakeholder-based process through which new policies, guidelines and strategies can be developed which will improve the quality of the river channel and flood plain for anadromous fish while at the same time meet existing goals and interests. In this one year project, the first two meetings will be spent identifying and inviting the different stakeholders, clarifying their goals and interests, understanding issues, and providing input into the process. The next two - three meetings will provide the stakeholders with an opportunity to help develop and analyze different alternatives which can help advance their mutual goals. In the last two meetings, the participants will advance new policies, restoration proposals, and other actions as proposals for implementation. Some of the proposed solutions will take no additional funds, only changes in policies and practices. Others might lead to consensus-based requests for funding habitat improvement and channel and flood plain maintenance and restoration projects.

BENEFITS: If successful, this project will lead to a new level of cooperation between agencies committed to improving the fishery habitat of the Stanislaus River and those mandated to enhance recreation and flood protection. New guidelines and policies will result in improvements in existing practices. A consensus on restoration and habitat improvement projects will lead to a greater likelihood for funding and successful implementation.

ESTIMATED COSTS: The proposed costs will primarily go to meeting facilitation and logistics. Stakeholders will voluntarily participate. Facilitation, pre-meeting conferencing and agenda distribution, minutes circulation and travel for six bi-monthly meetings are budgeted for $10,000. Copying, mail, and phone will account for an additional $1000.

STATUS: This project can be implemented immediately.

PROJECT PROPONENT: The Stanislaus Basin Stakeholders.

PROJECT TITLE: KNIGHTS FERRY GRAVEL REPLENISHMENT (#45)

LOCATION: Stanislaus River between Knights Ferry and the Orange Blossom Bridge.

BENEFITS: To improve spawning and incubation habitat for fall-run chinook salmon in the primary spawning reach, where two studies indicate that many riffles are heavily silted and intragravel dissolved oxygen levels are often low. Rather than attempting to clean the existing gravel, clean gravel would be added to the streambed to minimize both cost and potential problems with streambed instability. This project and the Goodwin Canyon Gravel Replenishment Project are complimentary, since they would attempt to correct two completely different problems. Goodwin Canyon does not have a sedimentation problem but gravel is scarce probably because of the high gradient, confined nature of the streambed. Conversely, there is plenty of gravel downstream from Knights Ferry, however suspended sediment concentrations are high during rain storms and may gradually reduce the suitability of the new gravel. Both projects may be necessary to restore the chinook salmon population in the Stanislaus River, which was estimated at only 168 fish in fall 1996.

Another benefit of this project would be to evaluate whether spawning is affected by the type of gravel added and whether the gravel can be stabilized for longer use. Gravel added to the Merced River in 1996 was used immediately by spawners but gravel added to the Stanislaus River at the Horseshoe Road Recreation Area in 1994 was used by very few spawners during the first three years. This project will evaluate whether spawner use depends on the (1) source of gravel, (2) whether river rock (rounded) or cracked rock is used, and (3) whether most of the substrate between 1/8 inch and inch is washed from the gravel mixture. In another evaluation, the effect of adding large boulders will be tested to determine whether gravel stability is improved. Boulder weirs were not effective at the Horseshoe Road sites. Concerns with flooding and rafting safety preclude more aggressive methods of stabilizing gravels in the Stanislaus River.

PROJECT DESCRIPTION: At 15 of the 45 natural riffles between Knights Ferry and Orange Blossom Bridge, approximately 220 cubic yards (300 tons) of gravel will be added to the streambed just upstream of each riffle. These areas tend to maximize downwelling of surface flow into the gravel, which enhances egg survival, and they are natural depositional areas that should maximize stability. Three riffles will be selected for each of 5 gravel types. Three control riffles will receive river rock from the Stanislaus floodplain of which 90% consists of a uniform mixture of 1/8 to 4 inch rock and 10% 4 to 6 inch rock. Three test riffles will receive river rock that does not come from the Stanislaus. Three other test riffles will receive cracked Stanislaus rock. Another three test riffles will receive Stanislaus rock that contains only 10% rock between 1/8 and inch. The last three test riffles will have two to three foot diameter boulders interspersed through the new Stanislaus gravel to increase stability. Rock will be added using a conveyor belt to minimize disturbance to the river bank and streambed. Gravel will be added to a maximum depth of 2 feet and streambed elevation will not be raised above the crest of the natural riffle. Access points will be revegetated if necessary. Monitoring is described in a separate project.

ESTIMATED COST: $260,000

STATUS: This project is in the conceptual stage, but could be implemented in 1997.

PROJECT PROPONENTS: The Stockton East Water District, U.S. Army Corps of Engineers, and Stanislaus River Parks.

PROJECT TITLE: KNIGHTS FERRY GRAVEL MONITORING (#46)

LOCATION: Stanislaus River between Knights Ferry and the Orange Blossom Bridge.

BENEFITS: To monitor the gravel replenishment project in terms of 1) use by spawners; 2) gravel stability, and 3) suitability for incubating eggs. The 1994 spawning habitat projects at the Horseshoe Road Recreation Area were poorly used by spawners and were not very stable. To investigate methods of improving the use and stability of gravel replenishment projects, five types of gravel will be tested at 15 riffles in the project reach. Monitoring will determine which type(s) of gravel are preferred by spawners and whether adding boulders or using round river rock affects project stability. Monitoring the suitability for incubating eggs is also important since suspended sediment concentration is high in the project area during rain storms, which are frequent during the incubation period for fall-run chinook salmon. Studies have shown that the impact of suspended sediment on intragravel dissolved oxygen concentration (i.e., egg survival) is greatly reduced in riffles that have low sand concentrations. This monitoring project will evaluate whether different mixtures of gravel sizes affect the impact of suspended sediment.

PROJECT DESCRIPTION: At each of the 15 project riffles, streambed stability, spawner use, and intragravel water quality will be monitored for three years. To monitor streambed stability, streambed elevations will be measured along 20 transects interspersed between the upstream end of the new gravel bed to the downstream end of the existing riffle. Streambed measurements will be made immediately prior to gravel addition and immediately thereafter. Additional streambed measurements will be made approximately 12 and 24 months after the gravel has been added. To monitor spawner use each year, project riffles will be surveyed for redds at 10-day intervals from October 20 through December 20. To monitor intragravel water quality at each of the 15 project riffles each year, piezometers will be installed in artificial redds (no eggs) at three sites in the newly added gravel and at three sites in the existing riffle. Indices of downwelling of surface water will include measurements of vertical hydraulic gradient and differences in temperature between surface and intragravel water. Vertical hydraulic gradient and intragravel dissolved oxygen concentrations will be measured at each of the 90 piezometers at 10-day intervals from October 20 to December 31 and on January 31. Differences in temperature between surface and intragravel water will be monitored with thermographs recording at 30-minute intervals between October 20 to January 31. One thermograph will be buried with each of the 90 piezometers. Piezometer sites will be characterized by local streambed gradient, water depth, and velocity.

ESTIMATED COST: $60,000 the first year and $40,000 for each of the second and third years. If the project riffles are still functioning after three years, then monitoring should be continued for another three year period.

STATUS: This project could be implemented in 1997.

PROJECT PROPONENTS: The Stockton East Water District, U.S. Army Corps of Engineers, and Stanislaus River Parks.

PROJECT TITLE: RIPARIAN HABITAT RESTORATION, STANISLAUS RIVER (#47)

PROJECT LOCATION: Approximately 20 acres along the Stanislaus River, primarily near Lovers Leap Recreation Area and other locations between Goodwin Dam and Oakdale.

BENEFITS: Although there is a superficial appearance of a lush and healthy riparian corridor along the Stanislaus River, there is little or no regeneration of native woody and herbaceous native riparian vegetation. Himalayan blackberry (Rubus procerus) is now widespread along the riverbanks and has outcompeted the native sedge, rush, herb, shrub and tree species that formerly occupied these mesic sites. On the floodplains and terraces, tree of heaven (Ailanthus altissima) has become widely naturalized and has displaced native alder, Fremont cottonwood, valley oak, and sycamore. Introduced annual grasses also dominate these upland sites and are inhibiting germination of native plant seeds in the soil.

Restoration of the native riparian vegetation, particularly cottonwoods, will ensure a supply of (1) large woody debris needed for channel maintenance processes and cover for juvenile fish, (2) organic input for fish food production, (3) soil stability to minimize sedimentation of spawning beds, and (4) shade that helps maintain suitable water temperatures. Channel maintenance processes and sedimentation are particularly important concerns, since the quality of salmon spawning habitat is quite poor in the Stanislaus River. In addition, an enhanced riparian plant community of many different life-forms (trees, shrubs, herbs, grasses and sedges) provides more wildlife benefits than does a simple shrub dominated blackberry thicket. The cottonwood zone of the riparian forest has the most complex architecture of any California vegetation, and the richest collection of animal species. More species of birds nest in this forest, for example, than in any other plant community.

PROJECT DESCRIPTION: A low-intensity, long-term vegetation management project will be implemented that repeatedly cuts blackberries, tree of heaven and annual grasses to gradually weaken and kill these exotic species while stimulating the natural regeneration of native species that lie dormant in riparian soils. This technique has been successfully used at the Cosumnes River Preserve, Traverse Creek on the Eldorado National Forest and Ringold and Hangtown Creeks in Placerville. This approach has the benefit of not aesthetically disrupting a recreational area, minimizing the risk of streambank erosion, and avoiding the adverse aquatic effects of herbicides.

Exotic species will be eliminated with four cuttings between spring and fall on approximately 20 acres to be designated by the U.S. Army Corps of Engineers. Blackberries will be removed using gas-powered hedge shears. Tree of heaven will be cut with chain saws and a weed eater will be used for cutting annual grasses. Native seedlings and seeds will not be disturbed. Cuttings should begin in early spring to maximize the likelihood that seeds of native species can successfully germinate and become established. If monitoring determines that natural regeneration of native species is unsuccessful, those areas will be seeded and/or planted with native species during winter. At the beginning of this project, all treated areas will be fenced to prevent livestock grazing. Changes in the distribution, abundance, and vigor of both native and exotic species will be monitored annually for five years.

ESTIMATED COST: The cost of exotic species removal is $30,000. Installation of fencing is $25,000. Monitoring costs are $5,000 per year for five years.

STATUS: This project is in the conceptual stage, but could be implemented in 1998.

PROJECT PROPONENTS: The U.S. Army Corps of Engineers, Stanislaus River Parks, Stockton East Water District, and the Stanislaus River Council.

PROJECT TITLE: VERIFICATION AND CALIBRATION OF SCREW-TRAP ESTIMATES OF JUVENILE SALMON MIGRANTS FROM THE STANISLAUS RIVER - FEASIBILITY OF USING HYDROACOUSTICS (#49)

LOCATION: Hydroacoustic stations will be established near the screw-trap sites at Oakdale and Caswell Park.

BENEFITS: Using screw traps to monitor the number of juvenile salmon migrants at Oakdale and Caswell Park provides the means to evaluate the collective effect of the restoration and management actions. Although screw-trap capture efficiencies have been studied with releases of marked hatchery fish, these data may not be adequate to estimate the total number of migrants with confidence. Unanswered questions and problems include: 1) the results of replicate calibration tests are quite variable and partially depend on the size of the release groups of hatchery fish; 2) whether calibration tests with hatchery fish reflect the trap's capture efficiency with wild fish; 3) whether wild fish migrate during the day when screw trapping is totally ineffective; and 4) low capture rates at high flows. If a suitable monitoring site can be located, then it may be possible to resolve these issues and ensure that the estimates of juvenile migrants are accurate.

PROJECT DESCRIPTION: This project would be conducted in two phases. The first phase would require a two week effort in late March to determine whether hydraulically suitable sites for hydroacoustic monitoring exist near the Oakdale and Caswell Parks screw trap sites. If suitable sites are located during Phase I, then Phase II would be initiated to compare hydroacoustic counts with calibrated screw trap estimates at two flows, the base flow and pulse flow releases between April 1st through April 30th. The Phase II report would discuss whether the screw trap estimates are adequate, and if not, whether combined hydroacoustic counts and screw trapping would solve the problems.

ESTIMATED COST: Phase I costs are $35,000. Phase II costs are $160,000.

STATUS: This project could be implemented in 1998.

PROJECT PROPONENTS: The Stockton East Water District.

E-028988

PROJECT TITLE: GOODWIN CANYON GRAVEL REPLENISHMENT MONITORING (#50)

LOCATION: Stanislaus River upstream of Knights Ferry downstream of Goodwin Dam.

BENEFITS: To monitor the stability, movement, and salmonid use of augmented spawning gravel.

PROJECT DESCRIPTION: The gravel and salmonid use will be monitored for three years due to the expected effects of gravel seasoning and grade adjustments of the augmented gravel.

Task 1. Physically Describe and Monitor Gravel Augmentation Sites. Map each of the four gravel augmentation locations for relative elevation and substrate composition (pebble counts) from above the head to below the toe of each study riffle. Verticals will not be more than two feet apart on each cross-section, cross sections located every 20 feet. One elevation map for each riffle will be developed prior to gravel augmentation and will represent baseline conditions. Mapping will be repeated soon after the initial spreader flow occurs and annually thereafter. Each of the surveys will be compared with one another to document elevational changes (fill or scour) within gravel augmented reaches. Elevational changes will be correlated with streamflow.

Task 2. Use of natural riffles as a control. Bedload transport rate and spawning activity rate will be monitored at nearby natural riffles for comparison with the augmented areas.

Task 3. Ensure that tracer gravels are not biased. Tracer gravels should move at the same rates as the imported gravel, otherwise they are not useful as tracers. The specific gravity, shape, and proportion of grain sizes will be compared between the tracer gravels and the rest of the imported gravel. It is necessary to perform this task only once.

Task 4. Assess potential rate of gravel transport and depositional areas in the study reach. Before spreader flows occur, habitat map Goodwin Canyon from upstream of the highest experimental site to Two Mile Bar in terms of gradient, channel confinement, and streambed roughness. Pools between the gravel augmentation sites and Two Mile Bar will be profiled.

Task 5. Monitor Gravel Movement. The area downstream of the experimental sites to Two Mile Bar will be searched annually for tracer gravels. The location of tracer gravels will be documented on a base map and the volume of new gravel deposited at each site will be estimated.

Task 6. Comparison of Native and Exotic Gravel. The augmented gravel will be compared to the native gravel in terms of size composition, fraction cracked, and angularity.

Task 7. Monitor Salmon Use Each Year. Salmon spawning use will be monitored at 10-day intervals from late-October through December. To monitor intragravel water quality, piezometers and thermographs will be buried in two artificial redds (no eggs) at the top and bottom of each site. Indices of downwelling of surface water will include vertical hydraulic gradient and the difference in temperature between surface and intragravel water. Vertical hydraulic gradient and intragravel dissolved oxygen concentrations will be measured at each piezometer at 10-day intervals from October 20 through December 31 and on January 31. Surface and intragravel water temperatures will be monitored with thermographs recording at 30-minute intervals between October 20 to January 31.

ESTIMATED COST: $70,000 the first year and $60,000 each year thereafter.

STATUS: This project could be implemented in 1997.

E-028989

PROJECT TITLE: MONITORING THE CHANNEL RESTORATION SITE AT THE OAKDALE RECREATION AREA, STANISLAUS RIVER (#51)

LOCATION: Captured Mine Pit adjacent to the Oakdale Recreation Area.

BENEFITS: Channel alterations from gravel mining in the Stanislaus River channel has created pond-like habitat within the river. It is thought that bedload transport is interrupted, stream waters are warmed, and predators such as largemouth bass, smallmouth bass, striped bass and Sacramento squawfish inhabit these sections in higher densities than the stream-like portions of the Stanislaus River and prey upon salmon juveniles at higher rates than at other parts of the river.

PROJECT DESCRIPTION: The restoration site will be monitored for three years.

Task 1. Document Habitat Changes. Quantity and quality of chinook salmon habitat will be evaluated with annual aquatic habitat delineation surveys. Stream length, aquatic habitat types, bank stability, shaded riverine aquatic cover, riparian continuity and depth, pool residual volume index, spawning habitat quality, rearing habitat quality, substrate composition, aquatic invertebrate quality, and instream cover will be assessed within each habitat. An air photo base map will be developed to be used as a reference for all tasks.

Task 2. Describe Annual Changes in Streambed Elevation. The restored section may have upstream and downstream influences, and a longitudinal elevation profile will be developed from about 2,500 feet above the restored section, through the restored section, and 2,500 feet downstream of the restored section. If as-builts survey data are not available, an elevation map will be developed by establishing, monumenting, and measuring a series of cross-sections with an electronic total station. Substrate composition will also be assessed with pebble counts.

Task 3. Monitor Bedload Transport Annually. Restoring the stream channel should restore sediment transport within these reaches. Bedload transport will be evaluated using flow records, comparisons of elevational maps and aerial photographs, video and photographs taken each year, bulk bed samples taken upstream, within, and downstream of the restored section, and pebble counts taken on newly formed bars.

Task 4. Monitor Water Temperatures. The removal of pond-like habitat will reduce residence time of water traveling through the restored reach. Water temperature loggers will monitor stream water temperatures at hourly intervals immediately upstream, within, and immediately downstream of the restored reaches, before and after restoration.

Task 5. Determine Predator Densities. Prior to restoration, the ponded area will be sampled to determine predator density. A nearby area with a similar gradient to the designed gradient of the restored area will also be sampled and will serve as a control. After the project area is restored, the predator densities will be resampled within the control and restored areas. Predator stomachs will be pumped to document level of predation on salmon juveniles.

Task 6. Document spawning activity within the reconstructed sections. Salmon spawning use will be monitored at 10-day intervals from late-October through December. To monitor intragravel water quality, piezometers and thermographs will be buried in two artificial redds (no eggs) at the top and bottom of each reconstructed riffle. Indices of downwelling of surface water will include vertical hydraulic gradient and the difference in temperature between surface and intragravel water. Vertical hydraulic gradient and intragravel dissolved oxygen concentrations will be measured at each piezometer at 10-day intervals from October 20 through December 31 and on January 31. Surface and intragravel water temperatures will be monitored with thermographs recording at 30-minute intervals between October 20 and January 31.

ESTIMATED COST: $100,000 the first year and $90,000 each year thereafter.

PROJECT TITLE: MONITORING THE WILLMS CHANNEL RESTORATION PROJECT (#52)

LOCATION: Stanislaus River downstream of Knights Ferry near Lovers Leap Recreation Area.

BENEFITS: Channel alterations from gravel mining in the Stanislaus River channel has created pond-like habitat within the river. It is thought that bedload transport is interrupted, stream waters are warmed, and predators such as largemouth bass, smallmouth bass, striped bass and Sacramento squawfish inhabit these sections in higher densities than the stream-like portions of the Stanislaus River and prey upon salmon juveniles at higher rates than at other parts of the river.

PROJECT DESCRIPTION: The restoration site will be monitored for three years.

Task 1. Document Habitat Changes. Quantity and quality of chinook salmon habitat will be evaluated with annual aquatic habitat delineation surveys. Stream length, aquatic habitat types, bank stability, shaded riverine aquatic cover, riparian continuity and depth, pool residual volume index, spawning habitat quality, rearing habitat quality, substrate composition, aquatic invertebrate quality, and instream cover will be assessed within each habitat. An air photo base map will be developed to be used as a reference for all tasks.

Task 2. Describe Annual Changes in Streambed Elevation. The restored section may have upstream and downstream influences, and a longitudinal elevation profile will be developed from about 2,500 feet above the restored section, through the restored section, and 2,500 feet downstream of the restored section. If as-builts survey data are not available, an elevation map will be developed by establishing, monumenting, and measuring a series of cross-sections with an electronic total station. Substrate composition will also be assessed with pebble counts.

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ESTIMATED COST: $90,000 the first year and $80,000 each year thereafter.

PROJECT TITLE: FLOODWAY AND LEVEE RECONSTRUCTION, TUOLUMNE RIVER NEAR WATERFORD (#53)

PROJECT LOCATION: Tuolumne River, from downstream extent of Santa Fe Aggregates (river mile 35.7) to upstream extent of 7/11 Aggregates (river mile 39.0), approximately 22 miles east of Modesto.

PROBLEM ADDRESSED: The relocation of aggregate extraction operations on the Tuolumne River from instream sources to pre-dam floodplains and terraces has resulted in off-channel pits separated from the river by small levees. In many cases, these levees were constructed to contain a maximum instream flow less than 9,000 cfs. In January 1997, flows exceeding 50,000 cfs breached most levees, connecting the ponds to the river in most locations. Additionally, nearly complete river capture occurred in a series of pits from river mile 37.5 to 38.4. Significant stranding may occur as the river recedes during the salmonid out-migration period.

PROJECT DESCRIPTION: Both aggregate operators in this reach will need to repair these levees as soon as the water recedes. Rather than rebuild the levees to the same inadequate capacity (and ecologically incorrect) as prior to the 1997 flood, we propose to redefine the floodway through this reach wide enough to safely convey the 50 year flood. Because the operators need to repair the levees anyway, cost-sharing now to pay for the additional cost of pulling the levees back, increasing floodway capacity, restoring a functional floodplain through the reach, and revegetating these floodplains is the most cost-effective means for developing a long-term floodway solution for this 3.3 mile reach of the Tuolumne River.

BENEFITS: Floodway capacity will be increased to adequately convey future floods up to a 50 year flood event. The reduction/prevention of levee failure will reduce the risk of river capture in off-channel aggregate extraction pits. Benefits include: 1) reduced salmonid stranding, 2) reduced future restoration/maintenance costs for both public funding sources and the aggregate operators, 3) potentially reduced flood downstream from floodplain storage, 4) increased riparian habitats, 5) increased diversity of salmonid habitats within the floodway, and 5) increased ability of the river channel to adjust its morphology without damaging human structures. Salmonid spawning and rearing can and does occur in this reach, but restoring the floodway width will both increase the quantity and quality of salmonid habitats through this reach.

ESTIMATED COSTS: Costs have not yet been estimated. Site topography data are currently being collected, and cost-estimates will be provided after these data have been reduced and cost sharing negotiations have taken place.

STATUS: Both aggregate operators have been contacted and expressed willingness to participate in cost-sharing. Channel and pond topography is currently being collected upon which cost estimates can be made. Negotiations for cost-sharing percentages has not yet commenced.

PROJECT PROPONENT: Santa Fe Aggregates, 7/11 Aggregates, and Tuolumne River Technical Advisory Committee (Don Pedro Project, FERC License No. 2299, participants include: Bay Area Water Users Association, California Department of Fish and Game, City and County of San Francisco, Friends of the Tuolumne Trust, Modesto Irrigation District, Tuolumne River Preservation Trust, Turlock Irrigation District, US Fish and Wildlife Service).

PROJECT TITLE: BIOLOGICAL EFFECTIVENESS OF EXPANDING FISHERIES LAW ENFORCEMENT (#54)

LOCATION: The Sacramento River System and the San Joaquin River System, including the Bay-Delta, and near-shore ocean.

PROBLEM ADDRESSED: The need for additional law enforcement to reduce poaching and harassment of returning salmon has been identified as an issue in virtually every salmon-producing subbasin of the Central Valley. Prioritization of investment in expanded law enforcement is hampered by the lack of specific information on the effectiveness of these measures. The magnitude of the poaching problem is the subject of great speculation, but numerous citizen reports indicate the problem is substantial and wide spread. A systematic analysis of law enforcement success and coverage is needed to determine the value of and best approach for increasing law enforcement.

PROJECT DESCRIPTION: Conduct a "*Needs Assessment and Adaptive Management*" of Enhanced fisheries and habitat law enforcement in the Central Valley, California spawning tributaries, main-stem rivers, estuary and near-shore ocean. The project will be patterned after revealing work completed in the Columbia Basin. This project will evaluate the input, output, and outcome of baseline and enhanced law enforcement effort in the Sacramento and San Joaquin River Systems. Further, it will set up a framework for *adaptive management* to maximize efficiency via inter-agency cooperation, strategic planning, cost-effectiveness, and accountability. The "*input*" may be considered the actual allocation and efficiency of enforcement effort, by area (e.g., watershed, subbasin, river system, and ocean fishery) and by salmon species and life cycle stage. "*Output*" is the result of fisheries and habitat enforcement in terms of law enforcement statistics: e.g., public outreach, information & education; contacts regarding various violations, warnings, arrests, prosecutions, confiscation of fish and equipment, compliance rates, and indications of deterrence. Quantification of "*Outcome*" is the most important measure of law enforcement effectiveness; these measures include actual public awareness & participation in fish conservation, habitat units protected, decreases in fish losses due to illegal activities, and ultimately increased salmon life cycle survival. The project will be designed in three phases: (1) baseline input/output evaluation and development of performance measures, (2) Outcome evaluation and assessment of needs for enhanced law enforcement effort, (3) Adaptive Management and long term monitoring of enforcement effectiveness. This synopsis provides a preliminary scoping for Phases 1 & 2. Phase 3 could be planned for later implementation, if deemed necessary.

BENEFITS: This project will help maximize the enforcement protection of depleted salmon stocks throughout the freshwater phases of their life cycles. Effectiveness of fisheries and habitat protection would be enhanced during adult migration from the estuaries through the riverine corridor; spawning areas and redds; juvenile rearing habitat; and juvenile out-migration from tributaries to the ocean. Furthermore, methodology would be developed to quantify the direct and indirect benefits of law enforcement and public awareness relative to survival of salmon populations. Salmon stocks that would benefit from this work include the Sacramento River winter run chinook stock (*endangered*), other chinook stocks (currently undergoing status review), and various steelhead stocks (proposed for ESA listing).

ESTIMATED COST:	Phase 1: Baseline Study	$18,000	FY 1997
	Phase 2: Adaptive Management	$55,000	FY 1998-99

STATUS: The California Department of Water Resources (DWR) has supported funding allocations to the California Department of Fish & Game (DFG) in order to provide additional game wardens (approximately 10 FTE) for the protection of depleted salmon stocks in the Central Valley. To date, the input, output, and outcome of the enhanced law enforcement effort has not been evaluated. This is a new proposal that parallels similar assessments that have been completed in the Columbia Basin.

PROJECT PROPONENT: San Joaquin River Tributary Association. Primary coordination with DWR and DFG law enforcement.

CONTACT: Steven P. Cramer, S.P. Cramer & Associates, Inc.

PROJECT TITLE: DETERMINE LOCATIONS AND POSSIBLE CAUSES OF MORTALITY TO CHINOOK SMOLTS WITHIN THE STANISLAUS RIVER (#55).

PROJECT LOCATION: Stanislaus River Between Knights Ferry (river mile 54) and Caswell State Park (river mile 6)

PROBLEM ADDRESSED: Mortality of out-migrating juvenile chinook occurs at unusually high levels within the Stanislaus River, but the causes are unknown. During 1996, the number of out-migrating chinook were estimated at two points (City of Oakdale and Caswell State Park) 34 miles apart, and only 40% of smolts passing the upstream site during the peak of outmigration (April 25 to May 10) were accounted for at the downstream site. Prior to the peak migration, generally less than 15% of outmigrants were accounted for, except for fry during a brief period in mid-February, when turbidity was high and flow increased sharply. Before taking hit-or-miss remedial action, we need to determine the location and probable causes of this high mortality.

PROJECT DESCRIPTION: We will track radio tagged chinook smolts through the Stanislaus River, starting in their rearing area above Oakdale (river mile 40), down to Caswell State Park (river mile 6). Radio tracking provides the quickest and surest method for identifying where fish are dying. A relatively small number of radio-tagged fish can provide more information than large numbers of conventionally tagged or marked fish. We would release small groups (10-15) radio tagged fish at different flows and actively track the fish as they migrate downstream following release. Fish that die or are eaten can be readily identified, because they cease to migrate downstream. We would place a fixed radio receiver near Caswell State Park to monitor and record all tagged fish that pass that point.

We will also not have to depend on recaptures at Caswell to estimate migration rate and survival. We can track how fast fish move and identify when and where they die. We will also be able to monitor daytime and nighttime behavior that we can't with conventional marking techniques.

BENEFITS: Radio tracking provides the quickest and surest method for identifying where fish are dying, and what the probable causes may be. Focused remedial action can then be taken. The pattern of mortalities, by time of day and river mile, will provide strong clues as to the causes of mortality. If predation is the principal problem, this can be easily identified when a tagged fish begins an entirely new pattern of movements, compared to those of a migrating smolt.

ESTIMATED COSTS: $100,000

STATUS: A similar proposal was reviewed by South San Joaquin and Oakdale Irrigation Districts before the high losses of smolts were identified in 1996. Given knowledge of high smolt, the Joint Districts now support this approach. The need to radio track smolts through the Delta is supported unanimously by biologists of the San Joaquin Tributary Group.

PROJECT PROPONENT: Oakdale and South San Joaquin Irrigation Districts.

CONTACT: Steven P. Cramer, S.P. Cramer & Associates, Inc.

PROJECT TITLE: PRIORITIZATION FOR FISH SCREENS AT DIVERSIONS IN THE SAN JOAQUIN BASIN TO PROTECT ANADROMOUS FISH (#56).

LOCATION: Merced, Tuolumne, Stanislaus and San Joaquin Rivers to the upstream limit of anadromous fish migration.

BENEFITS: Unscreened diversions that are entraining the greatest number of juvenile chinook will be identified, cooperative agreements with appropriate landowners will be negotiated, and priority order for installation of screens will be set. The fastest course of action to reduce losses of juvenile chinook by installing fish screens will be determined and implemented. The percentage of juvenile outmigrants saved by this action will also be estimated.

PROJECT DESCRIPTION: This project will assemble the information on water diversion timing and amounts, fish entrainment rates, and land owner cooperativeness. The location of pumps has already been identified and mapped by CDFG, and the next step is to determine which landowners will cooperate in a screening program, and which pumps are entraining the most fish. CDFG has identified and mapped over 150 unscreened diversions on the Stanislaus River alone. The diversions range anywhere from a few to approximately 100 cfs.

The project will begin with the creation of a GIS database by CDFG, including information on the location, size, type, water rights and ownership of each diversion on the river. The information will be used to contact and seek landowner cooperation with fish sampling. Once cooperative land owners have been identified, those pumps operated in such a way that is likely to take fish will be sampled to determine actual fish entrainment rates. We will use nets designed specifically to fit the unique configuration of each site to sample fish in the diverted water from 15-20 pumps. Work will be focused in the Stanislaus River during 1997. Mark-recapture tests will be used to estimate fish capture efficiencies. Sampling will continue about 10 days for each pump and fish entrainment rate will be estimated as a percentage of the outmigrants passing that location during the period. The number of outmigrants passing that location will be estimated under a separate contract through the USFWS , which monitors outmigration at river mile 6 of the Stanislaus River. Entrainment sampling will generally occur during April, May or June.

ESTIMATED COST: $110,000

STATUS: CDFG has placed high priority on this project. CDFG has surveyed the river multiple times and identified and mapped all of the water diversions along the Stanislaus River. Sampling could begin within 30 days of project start-up.

PROJECT PROPONENT: CDFG, San Joaquin Tributary Association, Oakdale and South San Joaquin Irrigation Districts.

PROJECT TITLE: SCALE ANALYSIS TO DETERMINE RACIAL COMPOSITION OF JUVENILE CHINOOK, AND TO DETERMINE AGE COMPOSITION OF CHINOOK SPAWNING ESCAPEMENT (#57).

PROJECT LOCATION: Scales collected from throughout the Central Valley. Office Located in Chico or Stockton.

PROBLEM ADDRESSED: This project would address two distinct problems. First, it would develop a new, low cost method of distinguishing the racial identity of juvenile chinook, wherever their incidental take is limited by the ESA. Recent genetics data have shown that the race of juvenile chinook captured in the Delta cannot be determined from the fish's length. It can be determined by DNA analysis, but that will cost $50-100 per fish. Alternatively, the number of circuli and their spacing on fish scales can be measured for about $1-5 per fish. Juvenile chinook lay down a new circulus about every 10 days, so fish of less than 1-month age difference will have different numbers of circuli, even though their lengths are similar.

Second, the project would provide quick and accurate estimates of age composition and size at ocean entry for chinook spawners throughout the Central Valley. Age composition of spawners must be determined in order to assign fish to the brood year that produced them, to complete a cohort analysis, or to complete stock-recruitment analysis. It has recently been shown that multiple regression models explaining smolt survival through the Delta are highly sensitive to assumptions regarding age composition of the spawners. Unfortunately, there is a large backlog of unanalyzed scales collected during chinook carcass surveys. These scales have been archived due to lack of manpower and money, but they need to be analyzed before we can correctly interpret the implications of variations in spawner escapement.

PROJECT DESCRIPTION: This project will provide the equipment and personnel to analyze scales sampled from chinook salmon throughout the Central Valley, and return data reports on short turn-around to the field project supplying the scales. Scales would be collected independently by ongoing field operations, and would be delivered in labeled scale envelopes to the scale project for analysis. The project would complete the following services: mount the scales, read and measure characteristics of the scales, complete statistical analysis of the collections (including appropriate comparisons to other collection), and provide detailed reports of findings.

The initial phase of the project for juvenile scales would be designed to develop a discriminant function that will enable the race, i.e. winter, spring, fall, late-fall, and origin (hatchery vs. wild) of each juvenile chinook to be determined with high probability. This phase will include securing and reading reference collections of scales from juvenile chinook in distinct racial rearing areas, eg. Deer and Mill creeks. A variety of scale and body measures (including fish length, circuli number, scale radius, and radius of first five circuli) will be taken, and the best discriminant function for mixed-stock analysis will be identified. Mixed-stock analysis will be tested with juveniles collected at the export pumps, and results will be compared to those from DNA analysis. Hybrid discriminant methods that include both genetics and scale data will be examined.

Scales from adult chinook would be read to determine age, length at each annulus, and length at ocean entry. Archived adult scale collections will be analyzed and age composition of past runs will be estimated. Additionally, between year variation in mean length at ocean entry will be determined and brood-year means will be estimated. These data are needed to determine the factors controlling survival rate and to determine sustainable harvest rates.

BENEFITS: An accurate and relatively inexpensive method will be developed for estimating incidental take of juvenile chinook from various races. Turn-around on analysis can be as short as a 2 days. Adult age composition from past run years will be estimated from archived scale collections, so brood year contribution can finally be estimated accurately. Variations in length at ocean entry over past years will be determined, and the relationship to smolt survival can be determined. A central office for analyzing scales from throughout the Central Valley will be established to provide ready access to all for this service and to enable quick turn-around of analysis.

ESTIMATED COSTS: $85,000

STATUS: The need for this work has been an ongoing topic of discussion among biologists of the San Joaquin Tributary Group. Work can begin within 30 days of contract signing.

PROJECT PROPONENT: San Joaquin Tributary Association, South San Joaquin and Oakdale Irrigation Districts.

CONTACT: Steven P. Cramer, S.P. Cramer & Associates, Inc.

PROJECT TITLE: INFORMATION SHARING FOR THE IMPROVEMENT OF ANADROMOUS FISHERIES IN THE SAN JOAQUIN WATERSHED (#59)

Location: Tuolumne, Merced, Stanislaus and San Joaquin Rivers

Problem Addressed: Lack of access to information causes problems in all areas of fishery restoration and with all stakeholders. At one level, it is difficult to even know who is doing what and what has already been done. On another level, it is expensive and logistically cumbersome to get all the information to those who want to receive it. Valuable information of interest to stakeholders and fishery biologists includes: meeting announcements and minutes, published documents, reports, and studies, metadata about GIS and other datasets, funding opportunities, and more. All participants in fishery restoration efforts in the San Joaquin system will be more efficient and successful if the information they need is easily available. Not only will time be saved and therefore more time available for analysis, costs can be saved that are presently spent in information duplication.

Project Description The non-profit Water On-line project is prepared to work with all the stakeholders to provide them with assistance to put their San Joaquin fishery related information onto the Internet. In addition, WOL would set up electronic mailing lists to which the stakeholders could subscribe and easily pass on information to all of those interested. WOL will assist the different players in putting up their own web sites so that the material they generate has a resting place. WOL will create Internet Resource Centers for the Tuolumne, Stanislaus, Merced and San Joaquin using the programming it is developing for the Bay Delta Internet Resource Center (www.bay-delta.org/bdirc). Thus each river would gain a subject-by-subject directory to nested information. This would be a public domain site run in coordination with CERES and the California River Assessment project. WOL will utilize interns from both local colleges and UC Davis to assist in the process. Most of the work will go into converting documents and material into becoming web ready format. Over the next two years, not only will most new information be put online, but many historic documents will be scanned, digitized and posted. WOL will use its sponsorships and Adopt-a-Web Intern program to finding additional funds and support.

Benefits: This project provides multiple benefits. All stakeholder groups will have greater access to information. Scientists will more easily find fishery related information. The material will be integrated into a unified and well-organized website that has support of the State Resources Agency. The project will leverage districts, water agencies and others to put up resources of their own to make the project successful. Overall communication will improve and better products will result.

Estimated costs: Even though Water On-line makes good use of interns to stretch dollars, it is difficult to know how much this project could cost because it is unknown how much material will be provided to be put on line. The basic structure of the four IRCs can be developed and put on line for $25,000. In addition, $25,000 per year for two years will provide all logistical support and four paid interns for two years. With this a large amount of material being programmed and put on line.

Status: This project could be implemented immediately.
Project Proponent: Water On-line

PROJECT TITLE: STANISLAUS AND TUOLUMNE WATERSHED PROJECTS TO IMPROVE WATER QUALITY FOR FISHERIES - PROPOSAL FOR STARTING RCDS IN TUOLUMNE AND CALAVERAS COUNTIES (#60)

Location: Stanislaus and Tuolumne Watersheds, Calaveras and Tuolumne Counties

Problem Addressed: Poor quality water runoff from ranch and farm land has negative impacts on salmon fisheries in numerous rivers and streams. Sands and fines clog gravel beds and can bury and smother salmon eggs. Sediment load negatively affects that shape and character of river stream channels and decreases the quality of in-stream habitat for salmon fry and smolts. When the weather is warmer, fine sediments can increase water temperature through increasing heat absorption from sunlight. Fishery studies to date indicate that poor quality water hurts salmon eggs and young in the Stanislaus River. Though the impacts are not statistically identified, decreases in water quality as measured in dissolved oxygen, temperature and toxic chemicals may be a major factor in the demise of smolts and fry living in and migrating from the river. Improvements in farm and ranch management practices and infrastructure in western Calaveras and Tuolumne Counties can improve the quality of the water that enters the Stanislaus and Tuolumne and thus benefit their fisheries.

Project Description: This project would organize and establish Resource Conservation Districts in Tuolumne and Calaveras Counties which presently lack this important organizational institution. In addition, this project would provide funds for pilot projects in the districts which would provide a clear incentive for volunteers to commit to being on the boards of directors and to helping. Initial investment would be in contracting a consultant to recruit stakeholders, organize and facilitate a series of organizational development and strategic planning meetings, and set up the organizations.. Within eight months the newly formed RCDs would hire a resource conservation consultant who will help develop evaluative procedures and criteria for selecting pilot projects, developing the monitoring program and writing documentation and analysis. In addition this person would work with the RCD and NRCS to help acquire additional funds and involve ranchers and farmers into the program. On-farm/ranch pilot projects which would be considered for funding include but are not limited to: sediment retention basins, vegetative filters, tail water return systems, dormant spray reduction practices and grazing management improvements. Pilot projects will incorporate different levels of monitoring to evaluate the replicability and success of the different practices. Monitoring, professional facilitation and other components may be contracted to consultants and universities.

Benefits: Developing two RCDs in this critically important part of the lower Stanislaus and Tuolumne watersheds is fundamental to instituting the types of management improvements in the watershed which will help improve water quality conditions that negatively impact the Stanislaus and Tuolumne fisheries. This initial investment in a planning, pilot project and monitoring program will likely lead to additional funds from other USDA and USEPA programs. Without an RCD, these areas are ineligible for most of this type of funding. .

Estimated Costs: The proposed costs will be divided between planning, logistics, monitoring, and pilot projects. $35,000 would pay for a consultant to organize the stakeholders, facilitate the first six months of meetings, and assist in the organizational paper work needed to begin the two RCDs. $90,000 would pay for three years of a resource conservationist to be shared by the two counties to provide technical help, project supervision, accounting, reporting, and grant writing. $400,000 would be available for pilot project implementation. $25,000 for informational support including: copying, printing, Internet distribution, mail, phone, technology training and meetings. A final $50,000 would be used for the initial baseline monitoring and three years of follow up monitoring and reports.

Status:. This proposal could move forward immediately.

Project Proponent: Stanislaus Basin Stakeholders

PROJECT TITLE: STANISLAUS FLOODPLAIN RESTORATION PILOT PROJECT (#61)

Location: Stanislaus River Flood Plain, Stanislaus and San Joaquin Counties

Problem Addressed: Recent flooding of land in the floodplain has provided an opportunity for some focused activities in the floodplain of the Stanislaus River, such as developing (restoring) wetlands on prior converted cropland (PC) to filter out sediments, pesticides and other water quality parameters of concern to the CALFED Bay-Delta Program and the San Joaquin River Management Program (WRP), Emergency Wetland Reserve Program (EWRP), Conservation Reserve Program (CRP), Wildlife Habitat Incentives Program (WHIP), Environmental Quality Incentives Programs (EQIP) and long term easements to adopt Best Management Practices and to restore critical sites on private property.

Project Description: USDA Natural Resources Conservation Service (NSCS) and USDI Fish & Wildlife Service (FWS) biologists, conservationists and engineers would evaluate potential lands for eligibility in WRP, EWRP, CRP, WHIP, EQIP and Partners for Wildlife Programs. The USDA Farm Service Agency (FSA) will administer CRP. The East Stanislaus Resource Conservation District (RCD) would provide local leadership and administer the CALFED portion of the project, which would include the remainder of the costs not already provided by other programs. The RCD would be responsible for any monitoring and reports required of the CALFED project. NRCS will coordinate restoration projects with appropriate agencies. This project will demonstrate the feasibility of restoring sections of the Stanislaus Floodplain from intensive agriculture to wetlands and wildlife habitat areas.

Benefits: Demonstrate to farmers that enough incentives are available for them to permanently quit farming floodplain soils for agricultural production, yet maintain ownership and control general access of the land for use as wetlands and riparian buffer/filter strips. This project is voluntary. Flood damaged levees would not be reconstructed which would begin to bring these lands into a more functional capacity to meet water quality, fisheries, riparian habitat and flood control objectives. In addition, water will be freed up that was used in farming. This water could have additional benefits for fish, especially if it helped free up New Melones water allocated to meeting the Vernalis water quality standard.

Estimated Costs: NRCS will pay up to $2,000/ac for WRP Contracts, 100% of Restoration on perpetual easements, 100% of appraisal costs, survey costs, closing and title costs, and cultural resources costs. Appraised values of lands in this area range from $3,500 to $6,000/ac. **If 1,000 acres were initially enrolled, CALFED cost is an estimated $3,000,000** including administrative costs to be negotiated with the RCD.

Status: This project could move forward quickly as the NRCS is already advancing a similar project on the Lower San Joaquin River.

Project Proponent: Stanislaus Basin Stakeholders

Appendix I

Tuolumne River Stakeholders' Recommended Priorities for Tuolumne River Projects

Tuolumne River Stakeholders' Recommended Priorities for Tuolumne River Projects for Inclusion in CALFED 1997 Workplan and Request for Proposals

March 21, 1997

TO: Cindy Darling, CALFED Bay-Delta Program

FROM: Tuolumne River Stakeholders

I. PURPOSE OF RECOMMENDATIONS

The purpose of these recommendations is to refine the project prioritization process started at the Bass Lake Technical Team Meeting by prioritizing near-term Tuolumne River restoration projects for inclusion in the CALFED 1997 workplan and request for proposals.

The recommendations target the following CALFED priorities:

- San Joaquin River Fall Run Chinook Salmon
- Instream Aquatic Habitat
- Shaded Riverine Aquatic Habitat

The Tuolumne River stakeholders recognize that their recommendations are of relative priorities which may vary or change depending upon the stated objective. These recommendations are made with reference to the draft CALFED Implementation Strategy to Identify Near Term Priorities for Bay-Delta Ecosystem Restoration.

II. EXISTING TUOLUMNE RIVER FISH HABITAT RESTORATION EFFORT

The Don Pedro Project is the largest storage reservoir within the Tuolumne River system. The City and County of San Francisco (CCSF) owns storage reservoirs in the upper Tuolumne River watershed and has a water bank account in Don Pedro Reservoir. The Don Pedro Project is owned by Turlock Irrigation District (TID) and Modesto Irrigation District (MID) and is licensed by the Federal Energy Regulatory Commission. Pursuant to their FERC license, TID and MID have conducted extensive fishery field studies on the lower Tuolumne River in cooperation with the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS).

A 1995 Settlement Agreement was signed by TID, MID, CDFG, USFWS, CCSF, Friends of the Tuolumne, Tuolumne River Preservation Trust, California Sports Fishing Protection Alliance, Tuolumne River Expeditions, FERC staff, and Bay Area Water Users Association, and was approved by the FERC on July 31, 1996. Pursuant to that agreement, a Tuolumne River Technical Advisory Committee (TRTAC) has been formed. The TRTAC replaces a Technical Committee formed under a 1986 Agreement among the Districts, CDFG, and USFWS.

Under the 1995 Settlement Agreement, the TRTAC is to identify ten priority fish habitat projects for funding primarily from outside sources. A minimum of two special run pool isolation projects are to be included in the ten priority projects. Special run pools are former in-river aggregate extraction sites, most of which were excavated between 1960 and 1974. Restoration of these pools are intended to restore these lake-like reaches back to a more natural riverine ecosystem. Preliminary designs for restoration of Special Run Pools 9 and 10, the highest priority special run pool projects, have been completed by McBain & Trush and the work was funded by TID, MID, and CCSF.

To carry out its mandate, the TRTAC recognized the need to develop an integrated, long-term restoration plan for the lower Tuolumne River that would maximize fish habitat improvements, minimize restoration action costs, and streamline project evaluation and monitoring. Funding for development of a $210,000 Tuolumne River fish habitat restoration plan has been achieved through a 50%-50% cost sharing between the TID/MID/CCSF and the USFWS through the CVPIA Anadromous Fish Restoration Program (AFRP). Under the plan, preliminary design work for restoration of Special Run Pools 5 and 6 is being funded. The restoration plan itself will be completed by December 1997. A copy of the final approved plan will be provided to CALFED.

In addition to the TRTAC activities, there are other efforts to improve fish resources and habitat conditions in the lower Tuolumne River, such as State and Federal activities under the 1988 Salmon, Steelhead Trout and Anadromous Fish Restoration Act and the Central Valley Project Improvement Act of 1992.

III. PRIORITIZATION PROCESS

Representatives from Tuolumne River stakeholders met on March 13, 1997, at the Turlock Irrigation District to refine the priorities for Tuolumne River projects discussed at the San Joaquin Basin Technical Team meeting at Bass Lake. The following stakeholders were represented at the March 13 meeting:

Bay Area Water Users Association: John Farnkopf
City and County of San Francisco: Ron Yoshiyama, Donn Furman
Department of Fish & Game: William Loudermilk, George Neillands, Tim Heyne
EA Engineering (TID/MID fisheries consultant): Dave Hanson
Fish & Wildlife Service: Sam Lohr

Friends of the Tuolumne: Dave Boucher
McBain & Trush (TRTAC geomorphologic consultant): Scott McBain, Bill Trush
Modesto Irrigation District: Walter Ward, William Johnston
Tuolumne River Preservation Trust: Tim Ramirez
Turlock Irrigation District: Wilton Fryer, Roger Masuda
TID/MID Aquatic Biologist: Tim Ford

Except for the time-sensitive First Priority project, the stakeholders agreed that because of the nature of the lower Tuolumne River and of CALFED's proposed project solicitation/selection/approval process, it was best to prioritize by river reach and types of projects (groupings) rather than to rank individual projects. However, each reach has example projects which the stakeholders recommend be included in the CALFED 1997 workplan and request for proposals.

The stakeholders agreed to divide the Tuolumne River below La Grange Dam into the upper one-half which encompasses the fall-run chinook salmon spawning area of the river and the lower one-half of the river. The spawning area was further divided into three separate reaches. One non-reach-specific study and one non-reach-specific project were also discussed and prioritized.

The following priorities are the consensus recommendations of the above listed stakeholders who met independent of the TRTAC.

IV. RECOMMENDED PRIORITIES

The stakeholders agreed to the following recommended priorities for Tuolumne River projects:

A. FIRST PRIORITY

Floodway Reconstruction (River Mile 40.7 to RM 35.7) (BL #53 and #16) – Bass Lake #16, M. J. Ruddy Floodplain Restoration, was the pre-1997 flood write-up of this project which received a High ranking at Bass Lake. This project is located in the Middle Spawning Reach. As a result of the January 1997 flood, the two aggregate operators, 7-11 Materials and Santa Fe Aggregates (formerly M. J. Ruddy), will need to repair their embankments which previously separated their operations from the river. This project would redefine the floodway through this reach wide enough to safely convey up to a 20,000 cfs flow by pulling embankments back where necessary, restoring a functional floodplain with stream meander belts, and revegetating the reach where appropriate. Since the aggregate operators will need to make repairs anyway, timely cost sharing by CALFED or other sources would make this project possible and would significantly help restore natural processes to this reach. The Tuolumne watershed stakeholders rated this project as the highest priority project if cost share funding and aggregate operator agreement can be obtained in a timely manner.

Post-Flood (January 1997) Assessment Study -- The stakeholders recommended that funds be provided to perform a post-January 1997 flood assessment study of the Tuolumne River to identify and quantify riverine ecosystem changes and to determine if additional restoration projects or actions of opportunity not currently identified should be implemented.

B. SECOND PRIORITY
UPPER SPAWNING REACH
La Grange Dam to Old Basso Bridge (River Mile 52 to 47.4)

The majority of the Tuolumne River salmon spawning and rearing occurs in this reach. The primary objective of the projects in this reach is to maintain good spawning gravel quantity and quality and to restore floodplain and riparian habitats.

The following are examples of priority projects for this reach:

Spawning Gravel Introduction and Gasburg Creek Sedimentation Control (Bass Lake Write-up #36) – This project received a High ranking at Bass Lake. This project would restore a coarse sediment supply to this reach and would reduce fine sediment loads originating from the Gasburg Creek watershed which is degrading this major spawning reach. Also included in this project would be utilization of desirable gravel tailings in this area for restoration work.

Basso Bridge Riparian Acquisition (BL #35) – This project involves the purchase of three parcels of riparian land, totaling 41.6 acres, on the south bank of the Tuolumne River between the La Grange Road Bridge and Basso Bridge. The property contains some fine valley oaks in addition to the typical riparian plant species such as willows and cottonwood. This land is contiguous to the La Grange Regional Park and would connect adjoining Stanislaus County-owned lands to the west and east. This project received a Medium ranking at Bass Lake.

Basso North Bank Easement or Acquisition – This project was not discussed at Bass Lake but complements the above Basso Bridge Riparian Acquisition.

Riparian Habitat Restoration (RM 47.4 to RM 49.9) (BL #39) -- Although this project received a "no consensus" rating at Bass Lake, the Tuolumne watershed group believes that this is a high priority project for this reach. This project would recreate functional floodplains and terraces, resurface floodplains and terraces with finer sediments conducive to riparian habitat initiation, reestablish cottonwood communities on floodplain surfaces and valley oak communities on terrace surfaces, regrade floodplain and terraces to reduce salmon fry stranding, and create alluvial features within the active channel to increase aquatic habitat diversity.

C. THIRD PRIORITY
LOWER SPAWNING REACH
Old Reed Rock Plant to Special Run Pool 10 downstream of Geer Road Bridge (RM 33.9 to 25.1)

The lower spawning reach is dominated by deep pools in the river caused by past in-channel aggregate mining. The primary objectives of restoration projects in this reach are to reduce in-channel predator habitat by selectively filling the deep pools, creating functional floodplains and terraces, restoring the riparian community, increasing spawning habitat, and facilitating bedload routing via channel restoration.

The following are examples of priority projects for this reach:

Special Run Pools 9 and 10 (BL #11) – This project received a High ranking at Bass Lake. In-channel aggregate mining created two large and very deep pools in the river at Special Run Pool 9 (RM 25.9) and at Special Run Pool 10 (RM 25.4). The two pools are located at the approximate mid-point of the lower Tuolumne River and near the lowest point of the spawning reach. SRP 9 and 10 were previously identified by the TRTAC as the highest priority channel restoration project because (1) they are located such that nearly all outmigrating Tuolumne River juvenile salmon have to swim through them, (2) many bass have been observed predating on juvenile salmon in these pools, and (3) they are the river's deepest pools which negate the velocity and turbidity benefits of high spring pulse flows. TID, MID, and CCSF funded the preliminary design work for this project. CVPIA AFRP has already agreed to provide $1 million for the project in FY 97 and has preliminarily agreed to fund 50% of this $4.1 million project. CALFED funds are needed to complete the funding for this project.

Special Run Pool 5 (RM 32.9 to RM 33.4) (BL #12) – This project received a High ranking at Bass Lake. Preliminary design work has been completed. The SRP 5 and 6 projects address the same restoration problems as the SRP 9 and 10 projects.

Special Run Pool 6 (RM 30.1 to RM 31.0) (BL #12) – This project received a High ranking at Bass Lake. Preliminary design work was recently submitted to the TRTAC for its initial review.

For consideration for inclusion in the CALFED 3 to 5 year workplan, the Tuolumne River stakeholders would like the CALFED staff to be aware of the following additional projects for this reach which are currently under study:

Special Run Pool 7 (RM 27.9 to RM 29.5) – This project would reconstruct the river channel and floodplain to reduce in-channel predator habitat, to improve spawning habitat, and to enhance riparian vegetation.

Special Run Pool 8 (RM 26.0 to RM 27.8) – This project would reconstruct the river channel and the floodplain to reduce in-channel predator habitat, to improve spawning habitat, and to enhance riparian vegetation.

D. FOURTH PRIORITY
MIDDLE SPAWNING REACH
Old Basso Bridge to Old Reed Rock Plant (RM 47.4 to 33.9)

A significant portion of this reach is subject to active aggregate mining operations. Current and past aggregate mining operations have resulted in a confined river channel and many ponded areas which were only separated from the river by embankments designed to handle 9,000 cfs or less river flows. The January 1997 flood which exceeded 50,000 cfs breached the embankments thereby connecting the ponds to the river in most locations.

The primary objective in this reach is the restoration of a functional floodplain with stream meander belts.

Ranking of this Reach: The Floodway Reconstruction project listed under the First Priority is a Middle Spawning Reach project; however, since that project was included in the First Priority and since the Reed Channel Restoration Project is scheduled to begin construction this summer, this reach's ranking was lowered to a Fourth Priority.

The following is an example of a priority project for this reach:

Reed Channel Restoration Project (BL #10) – This project received a High ranking at Bass Lake. The project has already been approved for funding by the Four Pumps Committee and is scheduled for construction in the summer of 1997 and 1998 if cost share funding commitments are met. The January 1997 flood will probably require a review of the design plans and possible revision of the construction work and schedule thereby resulting in an increase in cost.

For consideration for inclusion in the CALFED 3 to 5 year workplan, the Tuolumne River stakeholders would like the CALFED staff to be aware of the following additional projects for this reach which are currently under study:

Riffles 9-17 Reach (RM 44.3 to RM 46.5) – This project would reconstruct riffles, point bars, and portions of the channel, isolate backwater areas, and restore the floodplain and riparian habitat.

Special Run Pool 3 and Mine Tailings Reach (RM 42.5 to RM 44.3) – This project would restore channel features, close off backwater areas, construct floodplain using bar with tailings, and restore riparian habitat.

Special Run Pool 4 Reach (RM 40.7 to RM 41.5) – This project would fill a portion of the channel, construct point bars, and restore the floodplain and riparian habitat.

E. FIFTH PRIORITY
SHADED RIPARIAN AQUATIC HABITAT RESTORATION PROJECTS

While the First through Fourth Priority projects contain shaded riparian aquatic (SRA) habitat restoration components, the primary objective of the following projects is to restore SRA habitat within the Tuolumne River corridor. SRA habitat restoration projects were discussed in general at Bass Lake but no specific write-ups on Tuolumne River SRA projects were presented.

The following SRA projects are recommended as longer term projects:

The first three projects are located in the lower 25 miles of the Tuolumne River. This reach is below the salmon spawning area and below the major channel altering aggregate mining activities.

Empire/Hughson Riparian Restoration (RM 19.3 to RM 25.0). This project is immediately downstream of the spawning area and would restore 5.7 of SRA habitat.

Shiloh/Paradise Riparian Restoration (RM 0.0 to RM 11.0). This project would restore 11.0 miles of SRA west of Modesto to the San Joaquin River.

Modesto Riparian Restoration (RM 11.0 to RM 19.3) – This 8.3 mile reach is largely within the City of Modesto. Much of the north bank of this reach is a part of the Tuolumne River Regional Park and may be eligible for funding under Article 6, River Parkway Program, of Proposition 204.

Waterford Riparian Restoration (RM 31.0 to RM 32.9) – This project would restore 1.9 miles of SRA habitat in the Middle Spawning Reach near the City of Waterford and is located just upstream of Special Run Pool 6 (RM 30.2 to RM 30.9).

F. SIXTH PRIORITY
OTHER PROJECTS

Post-January 1997 Flood Assessment Study – Included in First Priority.

Adult Salmon Counting Structure (BL #34) – This project received a "no consensus" rating at Bass Lake. This project is intended to supplement and not replace the existing CDFG spawning escapement surveys performed on the Tuolumne River. Monitoring at this structure during the fall run escapement period would assist in determining the effectiveness of the above projects. It may also be possible to design the structure to accommodate hydroacoustical equipment to monitor fry and smolt salmon outmigration.

For any questions or additional information regarding these recommendations, please contact Tim Ford at (209) 883-8275.

[end of recommendations]

Appendix J

Comments on Preliminary Draft Workshop Report

Comments on the preliminary draft workshop report were received from many of the workshop participants. Some of the comments were recorded as edits on a hard copy of the document, but other comments were made and associated issues raised in separate correspondence. The correspondence is included in this appendix.

Comments from:

Scott McBain, McBain and Trush
Sam Lohr, USFWS
Marcia Wolfe, Friant Water Users Authority
Bill Loudermilk, CDFG
Elise Holland, The Bay Institute
Carl Mesick, Carl Mesick Consultants
Bill Johnston, Modesto Irrigation District
Jennifer Vick, Phil Williams Associates
Tim Ramirez, Tuolumne River Preservation Trust

E-029008

McBain & Trush | FISHERIES HYDROLOGY STREAM RESTORATION FLUVIAL GEOMORPHOLOGY
P.O. Box 663 • 824 L Street, Studio 5 • Arcata, California 95521
Phone: (707)826-7794 • Fax: (707)826-7795 • email: mcbtrsh@northcoast.com
William J. Trush, Ph.D.
Scott M. McBain, M.S.

28 February 1997

Mr. Scott Wilcox
EA Engineering, Science, and Technology
3841 North Freeway Blvd., Suite 145
Sacramento, CA 95834

RE: Comments on Draft San Joaquin Technical Team Workshop Report

Dear Scott:

Thank you for sending me a copy of the draft report, and providing an opportunity to comment on the document. As directed, I have made written comments on the draft report and enclosed it with this submittal. In addition to the minor comments shown on the enclosed document, I have two major comments on the process itself that stands far above all other comments in importance, and that is the issue of developing ecosystem restoration goals, and a logical prioritization system for ranking the proposed projects whose ranking is weighted on how a project achieves the restoration goals.

I. Restoration Goals

The opening sentence of the "Restoration Goals" section (page 5) describes broad goals of re-establishing biological and physical functions within the ecosystem, but that appears to be the extent of ecosystem restoration goals. Restoring an "ecosystem" is an abstract objective for most of us, and is usually the reason that only broad goals can be provided. However, without detailed goals (as with the salmonid numbers), achieving ecosystem restoration goals can never be achieved because there is nothing to say when we have reached them. The CALFED process has a mission, vision, and objectives of ecosystem restoration (see Draft Calfed Ecosytem Restoration Strategy June 18, 1996), thus the group has a responsibility of setting ecosystem goals. We have gone through the struggle of developing quantitative ecosystem restoration goals on the Trinity River, and have developed a set of process based "attributes for a healthy alluvial river ecosystem" that are quantifiable objectives (see enclosure)

These attributes are not meant to be identically applied to the San Joaquin River and its tributaries, but is meant to illustrate an approach CALFED participants should apply to define quantitative ecosystem restoration goals, upon which we can gauge future success upon.

II. Prioritization System

There is considerable public perception that many of the large dollar restoration programs use taxpayer moneys in an inefficient manner, with large administrative costs and much of the funds directed towards "studies" rather than "on the ground projects." To a large

degree, I share those concerns. Given the magnitude of funding provided by the CALFED program, we (the technical component of the process) have the critical responsibility targeting and expending these moneys in a logical and well though-out way that best restores the Bay-Delta Ecosystem.

As I stated during the 15-16 January 1997 Bass Lake meeting, a prioritization system needs to be developed that ranks projects based on: achieving restoration goals, and their effectiveness at reducing/eliminating limiting factors and other important stressors. The group made some important steps toward identifying stressors and ranking certain projects. However, a prioritization protocol was not developed; rather, a rushed vote of high, medium, and low priority was used. If there was no consensus, no ranking was given. Given the responsibility of achieving the greatest benefit from these public funds, we need to develop a logical prioritization protocol with which we can objectively evaluate projects. This protocol roughly consists of the following steps:

1. Develop future vision (objectives) for each watershed. This has partially been done (fall chinook numbers), but ecosystem restoration objectives have not been developed beyond "re-establishment of biological and physical functions" (page 5). Apparently there is a separate workgroup doing this for CALFED, but their information should be included here.

2. Develop prioritization criteria. This targets limiting factors and stressors.
   A) Incorporate site specific scientific research that has identified limiting factors to key species (this was not done at the Bass Lake meeting).
   B) Incorporate non-site specific research and professional judgment to identify additional potential stressors to key species.

3. Weight prioritization criteria. Which criteria are most important to restoring ecosystem objectives and key species objectives?

4. Develop potential restoration projects. This was largely done at Bass Lake, but as new projects are developed, we should be able to incorporate them into our implementation queue.

5. Rank restoration projects using prioritization criteria.

6. Examine results, reevaluate prioritization criteria. Is protocol working properly?

7. Implement highest priority projects first, followed by lower priority projects.

To illustrate how the system works, I have included two examples: one from a restoration project on the Williamson River delta in southern Oregon (they were evaluating restoration alternatives rather than individual projects), and the second is a draft list of potential restoration criteria that could be used to evaluate CALFED projects (equivalent to Steps 2, 3, and 5 above). These potential criteria are extracted from the stressor charts

developed during the Bass Lake meeting, and probably need to be pared down considerably to simplify this process.

Since many of the above steps have already been completed by the CALFED participants, I suggest that the work done to date be used to generate a prioritization protocol for each watershed upon which we can evaluate the projects basin-by-basin. I am more than willing to assist with this needed action on my own time, as I believe that it is crucial to base fund expenditure on a logical evaluation process.

Sincerely,

Scott McBain

Scott McBain

cc: Cindy Darling, CALFED Bay-Delta Program
Paula Landis, Department of Water Resources

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento-San Joaquin Estuary Fishery Resource Office
4001 North Wilson Way, Stockton, CA 95205-2486
209-946-6400 FAX: 209-946-6355

6 March 1997

MEMORANDUM

To: Scott Wilcox, EA Engineering, Science, and Technology

From: Sam Lohr, Fishery Biologist

Subject: Comments on the CALFED-SJRMP San Joaquin River technical meeting report

Thanks you for the opportunity to comment on the report. I have a few relatively minor comments and believe the discussions at the meeting on Monday were beneficial.

Page 2 The second and third bullets refer to limiting factors. However, stressors are discussed in the remainder of the report.

Page 5 Several important aspects of the goal of the Anadromous Fish Restoration Program were not mentioned in the description here (e.g., reasonable efforts, long-term basis, etc.). I suggest using text from the first paragraph under goals on page 2 of the AFRP draft Restoration Plan.

> The goal of the AFRP, as stated in section 3406(b)(1) of the CVPIA, is to "develop within three years of enactment and implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967-1991."

The text should also note that Section 3406(b)(1) states that "...this goal shall not apply to the San Joaquin River between Friant Dam and the Mendota Pool."

Appendix E--Existing Studies and Management Plans I have the following items on hand that may be appropriate for adding to the list of plans or studies:

> Aceituno, M. E. 1993. The relationship between instream flow and physical habitat availability for chinook salmon in the Stanislaus River, California. Final report May 1993. U. S. Fish and Wildlife Service, Sacramento, CA.

U.S. Fish and Wildlife Service. 1996. Comprehensive Assessment and Monitoring Program (CAMP), Implementation Plan. Draft report October, 1996. Sacramento, CA.

U.S. Fish and Wildlife Service. and U. S. Bureau of Reclamation. 1996. Anadromous Fish Screen Program. Process Document. Draft report July 1996.

Page F-10 Although Reed Channel Restoration Project (#10) is consistent with activities proposed in the AFRP draft Restoration Plan and there has been involvement from the USFWS ES Office, I am not aware of any involvement by CVPIA programs (see project proponent).

I hope these suggestions are useful and do not hesitate in calling if you have any questions.

FRIANT WATER USERS AUTHORITY

854 N. HARVARD AVE. • LINDSAY, CA 93247-1715 • (209)562-6305 • FAX (209)562-3496

February 28, 1997

Mr. Scott Wilcox
EA Engineering, Science and Technology
3841 North Freeway Blvd., Suite 145
Sacramento, CA 95834

RE: COMMENTS OF THE SAN JOAQUIN FISHERY TECHNICAL TEAM MEETING REPORT

Dear Scott:

I have a few comments on the document which follow:

Page	Paragraph	Comment
5	1	"... reestablishment of biological and physical [add here] 'ecosystem' functions,..."
5	2	I would be cautious with the use of materials from the AFRP. The revision of the AFRP relative to public comments was never completed and a final public review was not held. In addition, corrections of erroneous data and information have not been made. We did not discuss these numbers and goals in extensive detail at all at the workshop, so I do not think it is appropriate to include them here. I would not object to the use of the targets set by the actual CVPIA statute, as they are law. However, as has been expressed at both SRJMP meetings, the quarterly San Joaquin River monitoring meetings and this workshop, we have no sound method of obtaining repeatable, verifiable numbers of adults. We are planning ecosystem restoration. When a specific species is selected to be increased or managed for within an ecosystem, its increases are made at the expense of other species. For example, if a forest or rangeland is managed for elk, the deer numbers decrease. Numerous examples of this type of, management problem can be identified in the literature

E-029014

Page	Paragraph	Comment
		for a variety of different types of species. If grasses are managed for, ie. to be increased on rangelands, either in terms of cover or productivity, other species, ie. forbs and shrubs, are adversely affected. I have seen no evidence that similar types of effects are not experienced when management techniques are used to increase specific aquatic populations. The failure to recognize this effect throughout this process continues to be of concern.
18	1	A clear explanation of the ranking process (H, M, L) is not provided. The "forced" ranking done "enmass" was actually done using the "goal" of the maximum effect upon increasing fish. This ranking process is of concern because the "goal" skews the results. The "goal" is similar to the "old fashioned" forestry management approach of trying to obtain the most cubic feet of lumber per acre, or the "old fashioned" range manager's approach of attempting to grow the most pounds of beef per acre. These are not ecosystem management goals; they are specific species management goals, which are accomplished at the cost of other species and parts of the ecosystem. Of additional concern, the selection of fish maximization as a goal skews priority against projects designed for monitoring and evaluating the impacts of the enhancement projects. As a measuring weir or education project has no effect on the increase in maximizing fish on its own basis per se, these types of projects ended up with lower priorities. Monitoring projects should be in place in advance or at a minimum simultaneously with the implementation of the enhancement actions. Without sound monitoring and evaluation projects being implemented simultaneously with the enhancement projects, the whole approach cannot be evaluated, at a minimum. Further, adaptive

Page	Paragraph	Comment
		management cannot be properly implemented without sound monitoring.

Thank you for all the hard work you did on the collation of the information and preparation of this report for all the participants and the opportunity to provide these comments. We look forward to continuing to participate in the process.

Sincerely,

Marcia H. Wolfe
Staff Biologist

cc: Paula Landis
Dick Moss
Ron Jacobsma

E-029016

STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON, *Governor*

DEPARTMENT OF FISH AND GAME
REGION 4
1234 East Shaw Avenue
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March 14, 1997

Mr. Scott Wilcox
EA Engineering, Science and Technology
841 North Freeway Boulevard, Suite 145
Sacramento, California 95834

Dear Mr. Wilcox:

We have reviewed the draft report entitled "Joint CALFED/SJRMP San Joaquin River Fishery Technical Team Meeting Report" dated February 13, 1997 and are providing comments here and on the draft of your text. Mr. Clarence Mayott delivered this text to you on March 3, 1997 and this letter serves as a follow-up. We compliment you on this quick and thorough compilation.

Ms. Jennifer Bull, Mr. Mayott and I participated in the workshop at Bass Lake. Ms. Bull is one member of our study program team and Mr. Mayott is the lead person for our habitat improvement project in the basin. I am active in SJRMP and lead their effort to prepare the majority of the brief project descriptions provided, discussed and eventually ranked by workshop participants. My role within the Department of Fish and Game (DFG) is to supervise management and research efforts on anadromous fish in the San Joaquin basin. I regularly participate in field, management and policy activities and decisions for this basin. I believe it is important for you to acknowledge that DFG, and many other participants in the Bass Lake Workshop, will be participating in the CALFED process at many levels. Final DFG decisions regarding CALFED project priorities will involve several functions and levels within DFG. We will consider the technical group rankings from this brief two-day session along with many other factors in making final recommendations at the various levels of the CALFED Bay-Delta Program.

Our specific comments are made on the text of the February draft (attached) as requested in your correspondence. We offer a few additional comments here to further improve the utility of the document. For starters, the draft report would be more

useful to a broader audience if a map of the basin were included. It should cover the entire San Joaquin watershed and delineate the areas of focus by the workshop participants. A second map showing the general locations of each project or study would be helpful as a lead-in to the brief write-ups. This geographic perspective may be useful in apportioning funds. I believe SJRMP (or Department of Water Resources) may have base maps that would be easily edited to assist you. In developing such a "project distribution map," you may very likely begin to find significant overlaps in project locations.

In reviewing the brief project descriptions (and assuming descriptions for those without write-ups), we feel there are many projects/studies listed that could and should be molded together into more programmatic projects. They may ultimately be contracted out to different entities within each basin, but the results should provide more universal information. Starting out with a programmatic mindset, where feasible, will enhance the utility and credibility of the program. For example, the need for watershed assessments, gravel replenishment criteria, post flood assessments, riparian restoration, and channel maintenance flows is universal in the basin. I encourage you and the CALFED staff to consider this before you structure the Delta and Sacramento River basin team meetings. It may well be worth an additional section in the report. Obviously it goes beyond what the workshop participants had time to do, but I think it would be legitimate for the authors to pursue to provide a more useful product for decision-makers in and outside of CALFED.

Ecosystem restoration philosophy includes restoration of both physical and biological function and human uses of these resources. Therefore, I believe it is crucial that CALFED's 3- to 5-year program, and the long-term program, realistically recognize important biological limitations in this basin. The combined affect of system water development and use, and many other factors, seriously constrains the biological productivity of chinook salmon populations here in most years. Only in wet years when high flows override limiting factors (and we have enough juveniles produced to benefit from such occasions) do we see dramatic recoveries in adult salmon production. These are the conditions under which the human use opportunity for fisheries begins to reach a par with human use opportunity for the water. Unfortunately, this opportunity for fishery use has been fleeting at best.

Five- to ten-fold (or higher) salmon production recovery rates here are not uncommon. However, these are generally followed by similar rates of decline and

extended depressions in adult salmon production. From the human use in the valley perspective, there has been a steady long term declining trend in production (i.e., ten-year running average escapements since the late 1930's), and the duration and amplitude of cyclic escapement recoveries (i.e., 10- to 15-year patterns since the mid-1960's) have reduced and attenuated as well (see my graphic to visualize these points). Some would call this a serious reduction in population resilience.

Regardless, the benefits of physical habitat improvements alone (restoring a fraction of the physical function alone) will very likely be limited. The dramatic boom-or-bust production will continue and human uses will likely remain constrained due primarily to the "bust" periods. I believe the short-term program should employ a suite of measures that (a) begin to dampen this long-term rate of decline, by employing a suite of measures that (b) increase the short-term rate of population recovery as we go into wet cycles, (c) decrease the short-term rate of decline as we go into dry cycles, (d) heighten the base level of production and shortening duration of depressed production periods, and (e) perhaps heightening the peak production periods as we begin to see progress on dampening the long-term downward trend in production. It is this suite of measures, with an eye toward preserving natural production and the ability for the populations to survive and adapt over the long term, that we need to implement rather than just a narrow focus. In a sense, the Native Fishes Recovery Team goal hits at this issue but I don't believe it goes far enough given the realities of today.

My discussion during the workshop, with five minutes and that single graphic of historic spawning escapements back to 1953, did not adequately make this point. This was unfortunate because it may have logically influenced a more realistic discussion about the proposed Tuolumne River Hatchery. Many efforts dating back to the 1970's have attempted to recover salmon productivity here through physical habitat improvements. In general, they have not proven successful as an independent factor causing positive population response. I believe that careful use of additional artificial propagation should be included in the suite of projects for the San Joaquin basin if we want to increase the likelihood of ecosystem restoration success (including human uses of both fish and water). Irrespective of the content of the workshop report, these concepts and the issue of a robust suite of measures tailored to the realities in the San Joaquin basin will surely surface at all levels of the CALFED program.

Finally, the State Restoration Goals resulting from legislation in 1988 (Reynolds et. al., 1990) should be added to your report. They go far beyond the CVPIA and the Native

Fishes Recovery Team goals now in the draft report and would add perspective. They identify on a much broader scale what the state's long-term goals really are. Put another way, their inclusion would better represent the current deficit between historic and current human use opportunity of one key component of the ecosystem. Since there is a CAL in CALFED, our goals warrant inclusion.

Thanks in advance for incorporating our input.

Sincerely,

William E. Loudermilk
Senior Biologist Supervisor

WEL:aj

cc: Ms. Cindy Darling
CALFED Bay-Delta Program
Sacramento, California

Ms. Paula Landis
San Joaquin River Management Program
(DWR San Joaquin District)
Fresno, California

Mr. Alan Baracco
Inland Fisheries Division
Department of Fish and Game
Sacramento, California

Mr. Perry Herrgessell
Bay-Delta Division
Department of Fish and Game
Stockton, California

The Bay Institute
of San Francisco

Scott Wilcox
EA Engineering, Science, and Technology
3841 North Freeway Blvd., Suite 145
Sacramento, CA 95834

Re: San Joaquin Technical Team Workshop

Dear Scott:

Thank you for sending me a copy of the draft report, and for providing an opportunity to comment. In general, the Workshop was well run and has been well documented. My comments on the draft itself were minor and so I have not enclosed it with this submittal, instead I will make a few comments here. I hope that they are useful.

I have a major concern regarding the process that was employed to rank the projects at the conclusion of the workshop; and regarding the lack of communication and discussion between the two sub-groups prior to this exercise. I feel this may have compromised our efforts over the 2 day period. In effect, there was no communication between the groups and there was no real prioritization process that was developed or followed to achieve a ranking of restoration projects. This is important given the amount of weight these 'recommendations' could potentially have in the funding process insofar as how the Ecosystem Roundtable interprets the information. This issue should be reconciled.

This is not to say that the group did not make significant progress in determining the limiting factors and stressors, in the San Joaquin system, that effect the health and productivity of the fall-run salmon population. I do think, however, that the flow charts that were developed during the course of the Workshop could have been prepared ahead of time and then discussed. This would have allowed more time for development of additional projects, discussion, and evaluation during the plenary session.

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The draft document refers to the existence of broad goals for restoration in the San Joaquin basin. These goals are identified as being several, including the re-establishment of biological and physical functions, population recovery for fall-run chinook salmon, and maintenance of beneficial uses of that species. Numerical restoration goals for fall-run salmon are given, but there is no indication of how we will know we have achieved the former goal. Restoration of ecosystem functions can be relatively abstract and yet we will need some method for marking our progress. Perhaps CALFED is dealing with this issue in another forum. If so, it would have been helpful for that process to have been part of the Workshop discussion.

Many at the Workshop, myself included, were promoting an ecosystem approach to the development and implementation of restoration actions. I think that in large part this plea was heard, however I think that the species approach to restoration lives on in the minds of many people. CALFED must be sure to recognize the importance of identifying and restoring the channel processes that will result in the development of aquatic habitat and ultimately support fisheries. These are long-term objectives that will require significant commitment, the results of which will not be evident in the near future. As noted in the draft, restoration of these processes will address the causes of habitat degradation in the tributaries and the mainstem San Joaquin, as opposed to the effects, as well as provide increased diversity of habitat for a wider variety of species and life stages.

Finally, it would be helpful if at future workshops participants were more strongly encouraged to develop new project ideas in addition to those provided by CALFED for discussion. The fact that a packet of project descriptions was provided was certainly helpful, but may have put a damper on the creative process.

Thank you again for the opportunity to provide these comments. Please do not hesitate to contact me at (415)721-7680 should you have any questions regarding this correspondence.

Sincerely,

Elise Holland
Fisheries Program Director

cc: Cindy Darling, CALFED Bay-Delta Program
Paula Landis, Department of Water Resources

ATTACHMENT

Ranking of Additional Project Proposals*

Channel Restoration Site Monitoring at Oakdale Rec. Area	M
Coarse Sediment deficit/replenishment criteria: Stanislaus River	H
Stanislaus Watershed Projects: East Stanislaus RCD	H
Improving Stanislaus River Escapement Using Hydroacoustics	M
Verification and Calibration of Screw-trap Estimates of Stanislaus River Outmigrants	M
Fall run Salmon Otolith and Scale Evaluation	M
Tuolumne River Interpretive Center Conceptual Plan	L
Stanislaus Channel and Floodplain Maintenance Policy	H
Stanislaus River Temp Model and Operations Development	H
Riparian Habitat Restoration - Stanislaus River	M
Floodway and Levee Reconstruction Near Waterford	M
Channel Maintenance Flow Assessment	H

* Ranking based on limited review of proposals.

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26 February 1997

Via Facsimile

Scott Wilcox
EA Engineering, Science, & Technology
3841 North Freeway Blvd., Suite 145
Sacramento, California 95834
Phone: (916) 924-7450
Fax: (916) 924-7460

Re: Joint CALFED/SJRMP San Joaquin River Fishery Technical Team Meeting Report, 13 February 1997.

Dear Scott:

The following are my suggested rankings/changes to Table 4 and to Appendix E (Paula Landis' Presentation Summary). If you have any questions, please do not hesitate to call me.

TABLE 4 -- Ranks are as H (high), M (medium), and L (low)

Page 19, (2nd) Screen maintenance: Rank as M rather than H.

Page 19, (6th) Small diversion screening program - identify and prioritize sites: I would rank this an M rather than an H.

Page 20, (1st) Increase number of wardens: I would rank this an M or an H if conducted as a study. I've seen many poachers on the Stanislaus and they're very bold.

Page 21, (3rd) On-farm ag drainage treatment: I believe this is a project rather than a study. In fact Kevin Wolf helped devise Project No. 42, which should be ranked as an H and a project and moved to this location.

Page 21, (4th) Sediment management plan for Merced watershed (identify sources): Rank as H

Page 21, (5th) Pilot gravel ripping study on Stanislaus: Rank as L

Page 22, (3rd and 4th) Goodwin Canyon gravel Replenishment (writeup 21) and Monitoring (writeup 50) should be considered as a unit, both ranked as H with the former as a project and its required monitoring. However, the monitoring does include aspects of a study.

Page 22, (5th and 6th) Knights Ferry Gravel Replenishment (writeup 45) and Monitoring (writeup 46) should be considered as a unit. Both ranked as H with the former as a project and its required monitoring. However, the monitoring does include aspects of a study.

E-029024

Scott Wilcox 26 February 1997

Page 22, (7th) Channel Restoration Site Monitoring at Oakdale Rec. Area: This describes the required monitoring for Project Writeup No. 22 on page 29 and should be moved there. I would rank the restoration project (writeup No. 22) and its monitoring as low (L). The monitoring does include aspects of a study to fully evaluate the project as pilot work.

Page 22 (9th, 10th, and 11th) Coarse sediment deficit/replenishment criteria and Identifying locations to introduce gravel for the Merced, Stan, and Tuolumne: Rank all three as H.

Page 23 (4th) Establish monitoring for physio/chemical/temperature contaminant, ...: Rank as H

Page 23 (5th) Stanislaus Watershed Projects: East Stanislaus RCD: This project deals primarily with fine sediment control and should be moved/copied to page 21. Rank as H and as a project.

Page 24 (2nd) Tuolumne River flow enhancement study: Rank as H.

Page 24 (4th) Assessment/Feasibility of channel maintenance flows: Project No. 44 was intended here. However, I would rank it as L (because of the restrictions imposed by the Army Corps of Engineers) and as a study.

Page 24 (5th) Evaluate reoperation of New Melones to mimic seasonal variability: Rank as L. There's barely enough flow for minimum requirements and no verified benefits from flow variability in an incised stream channel.

Page 25 (3rd) Develop a hatchery strategy for the SJR: Rank as H. It could also be considered to be more of a project than a study

Page 25 (4th) Review and revise operation plan for the Merced River Fish Facility: Rank as H.

Page 25 (5th) Tuolumne River Hatchery Plan. I rank the existing plan as L. But I would rank incubation facilities (release all fish as fry) very highly for all three tributaries. The gravel replenishment programs should be tried to improve incubation conditions, and if those projects fail to correct problems, then incubation facilities should be planned.

Page 26 (1st) Adult salmon counting structures: Rank as H

Page 26 (2nd) Improving Stanislaus River Escapement Monitoring - Feasibility of Using Hydroacoustics. Should be ranked H as an alternative to counting structures (writeup no. 34) and as a study. The table should identify it as a two-phased approach. If hydroacoustics cannot work in the Stanislaus for counting adults, the cost is only $20,000. However, if it does work then comparing it with DFG carcass counts will be an additional $160,000

Page 26 (3rd) Verification and Calibration of Screw-trap Estimates of Stan River Outmigrants - Using Hydroacoustics. Rank as H and a study. This should also be identified as a 2 phase study.

Page 26 (7th - 9th) Educational and Interpretive Centers: Rank as L.

Page 26 (10th) GIS database of habitat and fluvial elements for Stan. Rank as L.

Page 26 (11th) Fall run salmon otolith and scale evaluation: Rank as I. The parties will not resolve the issues of what is wrong with the San Joaquin salmon based on past DFG data. Also, the dollar amount should be tripled for an accurate analysis.

Scott Wilcox 26 February 1997

Page 26 (12th) Stanislaus channel and flood plain maintenance policy: This should be moved to page 29 as it is a geomorphic reconfiguration project. I rank it as a M-L. It contains elements of woody debris management, which I believe is a very important issue for the Stanislaus. However, the Army Corps of Engineers, the rafters, and DFG appear to be unwilling to discuss this issue.

Page 27 (4th & 5th) Stanislaus River Temp Models & Operations: Writeup numbers, 23, 40, and 43 are all intended to do the same thing, just different proponents. I rank these studies as Low since crude models already exist. However, studies/modifications of New Melones Dam/Operations should be a very high priority, since we already know that there will be problems when the reservoir is low.

Page 28 (1st - 7th) Riparian Restoration - all rivers all reaches. Rank as H.

Page 29 (1st, 2nd) Graupner and Oakdale Recreation Restoration Projects and Monitoring: These are captured gravel pits in the Stanislaus that deplete gravel in only the riffle immediately downstream of the pits. It is also highly unlikely that these pits contain resident predator populations, although those pits downstream of Riverbank are full of predators. Rank as L, too expensive and almost no benefit.

Page 29 (10th and 11th) Willms Channel Restoration Project and Monitoring: This pit is in the middle of the primary spawning reach in the Stanislaus and so is the most important and cheapest of the three projects for the Stan. As a pilot study, I rank this one as H. The project and monitoring should be voted/ranked as a unit.

Page 30 (1st) Coord. Management of Woody Debris in the Stanislaus. I would rank this as H and as a project. Elements of Writeup No. 44, primarily facilitating meetings among concerned parties to discuss remedies/changes in management, would be pertinent.

Page 30 (6th) Channel maintenance flow assessment. Rank as L due to lack of water and Army Corps' restrictions.

Appendix E: Summary of Presentation by Paula Landis, Existing Studies, page 3. Both of the reports credited to Thomas R. Payne & Associates are actually my reports. They were produced for Neumiller & Beardslee and the Stockton East Water District. I mentioned this to Paula at Bass Lake. The correct citations are:

Carl Mesick Consultants. The Effects of Minimum Instream Flow Requirements, Release Temperatures, Delta Exports, and Stock on Fall-Run Chinook Salmon Production in the Stanislaus and Tuolumne Rivers, draft report May 1996;

Carl Mesick Consultants, Aquatic Systems Research, and Thomas R. Payne & Associates. Spawning Habitat Limitations for Fall-Run Chinook Salmon in the Stanislaus River Between Goodwin Dam and Riverbank, draft report July 1996.

Sincerely,

Carl Mesick

Carl Mesick, Ph.D.
Fishery Biologist

MID Modesto Irrigation District
Water and Power

TO: Scott Wilcox

FROM: William R. Johnston

DATE: February 25 1997

RE: Draft San Joaquin Technical Team Workshop Report

I have reviewed the draft San Joaquin Technical Team Workshop Report and have the following comments and suggestions:

Page 2, next to last line.
Rewrite sentence ...presentations included an example, using the Merced River, to illustrate the history of human intervention...

Page 3, 2nd line of first full paragraph.
Rewrite sentence ...downstream of its confluence with the Stanislaus River, and 2)...

Page 3, 4th line of second full paragraph.
Add to end of sentence ending with the word program "and individual non-project districts and agencies."

Page 4, 2nd line,
Rewrite sentence ...first component to utilize the currently available restoration funds.

Page 4, 6th line.
Delete everything in sentence after the word "taken" and add "to improve habitat and fish production."

Page 9,
Under the Geomorphic Process Section, there should be some discussion that there is a watershed analyses study already underway for the Tuolumne River watershed. Table 4 recommends such studies for the Merced and Stanislaus Rivers, but not the Tuolumne.

Page 13 & 14,
Under the section on Water Temperature Control, there needs to be some discussion on the limitations on using flow for temperature control. In general, he opportunity to use flow for such

is quite limited and only allows the control of temperature in a relatively short reach of the stream where temperature may be a problem. We do not want to leave the impression that flow is the answer to all temperature problems.

Page 14 & 15,
Under the section on Flow Regime, there needs to be some reference to the new FERC flows on the Tuolumne River. These flows are the result of intense negotiations between the fish agencies, the irrigation districts and a number of environmental and others. These are new improved flows established to benefit fall run Chinook salmon and were based on ten years of study. There is no need to provide additional flows on the Tuolumne River.

Page 17, Second line,
Rewrite to make two sentences, ...mortality. Altering .... diversions...

Table 4. Illegal Harvest
Why does the "Increase number of wardens" & "Modify angling regulations" not apply to the "SJR below Merced"?

Do not hesitate to call if you have any questions about my comments. 209-526-7384

Post-it® Fax Note 7671	Date	# of pages ▶ 2
To Cindy Darling	From	
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Phone #	Phone #	
Fax #	Fax #	

Jennifer Vick
38 Ford Street
San Francisco, CA 94114

Ms. Cindy Darling
CALFED Bay-Delta Program
1416 North Freeway Boulevard, suite 145
Sacramento, CA 95834

March 7, 1997

Dear Ms. Darling:

Thank you for the opportunity to participate in the San Joaquin River Fishery Technical Team Meeting. I have reviewed the meeting report and have a few comments, both general and specific.

Genral Comments

What concerns me most about the current project planning and prioritization process is that it seems to be driven wholly by available project proposals rather than by an analysis of ecological (both physical and biological) processes. This project-driven approach is the proverbial "cart leading the horse" and will likely result in the completion of a disjointed series of projects that fail to address the large-scale physical processes that drive these systems.

In place of the project-driven approach, I recommend that CALFED adopt a process-driven approach. Such an approach would first identify key processes that drive the system under natural or healthy conditions and quantify how these processes have been modified. This information will provide a foundation for identifying a system of integrated projects that can address ecosystem function at the landscape or watershed scale. By restoring large-scale physical processes, these projects would address long-term aquatic habitat quality not only for salmon but also for other native species in that use the river corridor.

In developing the process-based program, the watershed or channel studies for the Stanislaus, Merced, and San Joaquin Rivers should be the highest priority. (A study which can be used a model is being conducted by McBain and Trush on the Tuolumne River.) These studies would quantitatively determine how flow, sediment (coarse and fine) supply and transport, and channel morphology affect ecosystem function in these rivers and would develop recommendations to address the issues identified. Included in this, the studies would address potential for floodplain and riparian habitat restoration through the establishment of wider floodways. At the workshop, Scott McBain, of McBain and Trush, and myself constantly argued the need for this large-scale analysis to guide process-driven restoration efforts. However, the report fails to address this process-driven approach and is limited to the prioritization of project proposals.

Specific comments:

p. 9 Why is the discussion of geomorphic process limited to "related fine sediment and gravel issues"?

p. 14 "Flow Regime" should be part of or integrated with the "Geomorphic Processes" section.

P.15 "Gravel Quantity and Quality" should be part of the "Geomorphic Processes" section. In addition, gravel replacement and restoration projects must be planned and designed with consideration of overriding geomorphic processes. Failure to adequately analyze and address geomorphic processes in the project design will result in project failure, as with the projects constructed under the Four Pumps Agreement.

P. 25 Why are new hatcheries incide in the CALFED plan? CALFED is mandated to address *natural* production.

7 March 1997

To: Scott Wilcox
EA Engineering, Science, and Technology
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Sacramento, CA 95834

Cindy Darling
CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, CA 95814

Post-it™ Fax Note 7671	Date 7 MAR 97	# of pages ▶ 4
To SCOTT/CINDY	From TIM RAMIREZ	
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From: Tim Ramirez
Tuolumne River Preservation Trust

Re: Comments on Draft CALFED/SJRMP San Joaquin River Fishery Technical Meeting Report

Dear Scott and Cindy:

Thank you for the opportunity to comment on the draft report from the technical team meeting at Bass Lake. My comments (some of which we discussed Monday) concern the workshop planning process, the draft report, and activity following the workshop.

Workshop Planning and Process

The workshop agenda starts with a history of the San Joaquin River system and an overview of habitat and population conditions. It then jumps to existing programs, studies, and management plans and their goals and objectives for restoration. I suggest that this discussion follows the section on identifying and prioritizing problem areas and limiting factors (stressors). Our break out group (the Merced and Tuolumne Rivers and the San Joaquin River upstream from its confluence with the Stanislaus) never got to the point of prioritizing stressors, even though a few of us suggested many times that this was an important step. We only listed the stressors after spending too much time outlining the interaction of factors affecting salmon production at different life stages. This led the group astray, and from my perspective we never recovered.

Once the stressors have been identified and prioritized, then we can review the existing studies, projects, and management plans to see how each addresses these issues. This process will identify gaps in current activity, which then leads to the identification of solutions. Solutions (not necessarily projects) can then be prioritized by determining how they address the prioritized stressors.

The workshop was too focused on getting to the project stage. CALFED is focused on restoring ecological functions and processes. This being the case, workshop participants should have been asked to focus on identifying and prioritizing stressors that impact these functions and processes. To the extent that existing studies and/or programs address stressed ecological functions and processes, the discussion of projects is relevant. This process, as stated above, should also identify gaps, which then begins the process of identifying solutions. By starting with existing studies and programs, we immediately limit ourselves to salmon-related issues, instead of focusing on ecosystem functions and processes.

E-029031

Because we never got to prioritize stressors, the ranking of projects done by the entire group at the end of the workshop is almost meaningless. In practice, we ran through a list of existing projects and ranked them high, medium, or low: We could have done this without taking the preceding day and a half to outline the factors affecting production, since we never bridged the gap between that activity and ranking projects.

The geographic breakdown of the working groups should have been: (1) the three tributaries; and (2) the mainstem San Joaquin from Friant to the Delta.

Draft Report

1. The "stressor charts" should be in an appendix. Unfortunately, the Draft Project List (Table 4, the dominant feature of the report) makes no connection to these charts. (There should have been an opportunity to combine these charts, and/or the two groups should have started with the same framework so that we ended up with similar structures, e.g., affected life stages.)
2. Table 2 is a product of Table 1, and is more focused. I suggest moving Table 1 to an appendix, or eliminating it from the report.
3. The headings under the description of stressors should match those in the Draft Project List (Table 4), and somehow capture each of those listed in Tables 2 and 3.
4. The columns in Table 4 should only reflect discussion at Bass Lake. The reference to a write up number, the ranking, and the geographic location make sense (even though there are obviously many concerns with the ranking process). Project proponent, readiness, and cost estimate were not discussed at the workshop, and should not be included in the report. While these may be issues that SJRMP is more focused on, they are not appropriate for this CALFED report. One of the goals for the workshop was to develop a package of prioritized restoration projects - not to assess their level of readiness, estimate the cost, or suggest a project proponent. These headings restrict the focus to things "in the hopper."
5. The proposed Tuolumne hatchery is not part of any comprehensive ecosystem restoration program, and its listing in Table 4 only points to the failure of the workshop to function within its intended scope. If we had identified and prioritized ecosystem stressors, and then identified solutions based on this process, the Tuolumne hatchery would not have been identified as a potential project.
6. As we discussed on Monday, I am not including a ranking of projects that were not ranked at Bass Lake (or those projects that were submitted after the workshop). I prefer that the report reflect the activity at the workshop, and not be a compilation of comments made independently afterward.

After Bass Lake

Unfortunately, after the workshop there was a rush to submit "CALFED project proposals" to SJRMP and CALFED. Regardless of how this wildfire started, it needs to be extinguished. I think our discussion on Monday was a step in the right direction, but there are many people who were not present, and they (and the participants in the technical teams) need to have a clear understanding of the process that CALFED and the Ecosystem Roundtable are developing for making funding decisions this year.

I recognize that at this point we are in a difficult position. Because the workshop did not result in the identification and prioritization of ecosystem stressors, we have no framework for evaluating these new projects. Obviously, these one-page summaries are not a response to a request for proposals (RFPs), and funding decisions will be made on the

merit of more detailed proposals at a later date. The question is: how will CALFED present the RFPs when the technical teams have completed their work so that important projects and/or studies not discussed at the technical workshops have an opportunity to be evaluated as potential solutions that address ecosystem stressors?

I understand that the CALFED staff works under severe time constraints, and I appreciate the time and effort being given to this process. However, given the magnitude of the funding available and the work that needs to be done within the system to improve conditions, it is crucial for this process to clearly articulated and justifiable.

I look forward to continuing to work with you both. If I can be of any assistance in the planning process, I am available at your convenience.

Sincerely,

Tim Ramirez
Tuolumne River Preservation Trust

attached: Tuolumne River Floodplain Restoration Pilot Project

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