

In cases where recommended actions are defined as studies, only reconnaissance level information was available and San Joaquin River Management Plan did not have the time or the funds to complete a feasibility level study. Studies have been recommended based on the degree of consensus, potential benefits, costs, and the potential for implementation.

Table 2 lists the recommended studies and shows the page number where they are discussed in this chapter.

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RECOMMENDED STUDIES	
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Conjunctive Use

Conjunctive use of ground water and surface water in the San Joaquin Basin needs to be improved to enhance water supplies.

Background

Water districts on the east side of the San Joaquin Basin are now conjunctively using ground water and surface water supplies to meet domestic and agricultural demands. It may be possible to refine and enhance conjunctive use programs through modified water management and operations and/or with storage/recharge facilities. In addition to improving water supply flexibility, there may be improvements in instream flows to aid Chinook salmon, water quality in the San Joaquin River, and recreational opportunities.

Study

The U.S. Bureau of Reclamation and Department of Water Resources should work with reservoir owners/operators and ground water pumpers in San Joaquin River tributary basins to evaluate improved conjunctive use potential.

Costs and Funding Sources

Costs are yet to be determined. Potential funding sources are CVP water users, tributary reservoir owners, ground water pumpers, and non-reimbursable funds.

Conjunctive Use

Related Activities

After improved conjunctive use potential (water availability and timing) is defined, the Fisheries, Water Quality, and Recreation subcommittees need to refine conjunctive use proposals.

Conflicts and Resolution

Changes in point of diversion, place of use, and purpose of use may require a water right review.

Implementation

Potential implementing agencies are the U.S. Bureau of Reclamation and/or tributary basin reservoir owners and ground water pumpers.

Delta Salmon Loss Mechanism

Direct and indirect juvenile salmon mortality associated with CVP/SWP water export and other Delta mortality sources requires additional studies.

Background

The Interagency Ecological Program has been studying juvenile salmon survival in the Delta since the 1970s. Recently the scope of the Interagency Program studies has included San Joaquin system salmon needs. Agreements are in place to mitigate for direct salmon losses caused by the SWP/CVP Delta pumps. Ways to mitigate indirect losses are also being considered through the Article VII and Framework Agreement processes. There have also been efforts in recent years to coordinate San Joaquin spring outmigration flows with export operations and barrier installation. Tagged smolt releases are used to evaluate the effectiveness of flow coordination.

Study

Continue and focus the Interagency Ecological Program and related studies to define the mechanism of juvenile salmon mortality in the Delta. Understanding the mechanisms is key to selecting compatible solutions.

Costs and Funding Sources

Costs are unknown. The Central Valley Project Improvement Act could provide part of the additional funding. To a certain extent, the general focus of existing studies may be redirected to more specific studies. In some cases, integration of related studies with Interagency Program expertise can yield useful information.

Delta Salmon Loss Mechanism

Related Activities

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Salmon Predation Reduction (Juveniles)	90
Salmon Trapping and Moving (Juveniles)	160

- Existing Interagency Ecological Program and Department of Fish and Game Region 4 programs.
- San Joaquin River Management Program *Central Valley Salmon Action Plan* (Sections 4j, k).
- Central Valley Project Improvement Act Section 3406(b)(4).

Conflicts and Resolutions

Unknown.

Implementation

The Department of Fish and Game and U.S. Fish and Wildlife Service would be the primary agencies conducting studies, with support from the U.S. Geological Survey, Department of Water Resources, and others.

The Central Valley Project Improvement Act requires a program to mitigate Tracy Pumping Plant impacts on fish.

Dormant Pesticide Toxicity Reduction

Recent studies of water quality during winter storms indicate toxic concentrations of dormant-season pesticides are reaching the San Joaquin River.

Background

The source of contamination is speculated to be from spray applied to orchards, which somehow is getting into the river. Peaks in pesticide concentration occur in the early stages of runoff from rainstorms just after dormant pesticides are sprayed on orchards. This suggests a rapid route from trees to channel.

Study

Identify and manage the route by which orchard pesticides enter the river. Field investigation and coordination is needed with the Department of Pesticide Regulation and County Agricultural Commissioners to determine how dormant-season sprays are reaching the river during storms.

Benefits

Toxic concentrations of pesticides that now cause mortality of aquatic organisms could be avoided. There may also be opportunities to manage erosion or sediment, depending on the methods used to manage toxic runoff, such as buffer areas or detention basins to delay and absorb toxic runoff.

Costs and Funding Sources

Studies to identify the route of pesticide travel can be relatively inexpensive. If two people are employed to sample residues on vegetation and in runoff during storms and a laboratory is retained to process a few thousand samples, costs should be under \$200,000 per year, and 2 or 3 years should be enough time to track down the major routes of entry. Once identified, the most economical methods to control the problem would need to be proposed and implemented; costs of these measures cannot yet be estimated.

Funds could come from the Federal Government or State General Funds.

Dormant Pesticide Toxicity Reduction

Related Activities

Other survey and inventory activities, Geographical Information System data, and aerial photography can show where orchards are near channels and help define sites to study.

Conflicts and Resolutions

The intent of this proposal is to follow up on a problem that was partly revealed by U.S. Geological Survey water quality investigations. The USGS study quantified concentrations of pesticides in storm flows and indicated the time of entry and land uses in channels with high concentrations. Users of dormant pesticides doubt that washoff of spray from orchards can be the source, because the volume of runoff from their orchards is small or none. If orchards are found to be the source, the way dormant sprays are used or regulated would have to be changed, which might be costly to orchard operators. Good data on the route of entry will help resolve this concern and may show ways to save on application costs.

Implementation

These are short-term actions that could be implemented quickly by the Department of Pesticide Regulation in the California Environmental Protection Agency. As a study or action undertaken to eliminate an environmental hazard, this activity would be categorically exempt under CEQA. No legislation would be required, but because pesticide regulation is quasi-legislative, it would take a Department of Pesticide Regulation action to implement any changes. This would introduce a procedural constraint on implementation.

The implementing agency for this kind of study might be the California Environmental Protection Agency, the Department of Fish and Game, or the Regional Water Quality Control Board.

Drainage Management — Irrigation Management

The San Joaquin Basin is accumulating salt in the soil from an imbalance between influx and outflow, with resulting problems for crop production, fish, and wildlife.

Background

The San Luis Drain was constructed to serve areas irrigated with CVP water and having impeded drainage. To dispose of the drain water, it was routed to Kesterson National Wildlife Refuge, where the water evaporated and the dissolved materials became concentrated. Food chain concentration of selenium was discovered at Kesterson Refuge, and facilities contributing drain water to Kesterson were closed.

Irrigation management has always focused on how to provide water of a quality, quantity, and timing to make crop production possible. Irrigation needs to be managed to make best use of available water resources for all purposes in the basin. Improved irrigation management in wet years can be used to maximize salt mobilization. This proposal extends that idea to all years to avoid the accumulation of high salt concentrations at any time.

Study

Study ways to apply water more uniformly to agricultural lands, using improved technology such as drip or sprinkler irrigation or adding acrylamide polymers to the water to maintain infiltration rates in furrows. If the leaching fraction is managed carefully to just prevent salt accumulation in the rooting zone, there should be some reduction in agricultural water demand. The lower demand might allow reduced diversion from the San Joaquin River or the Delta or permit a more flexible pumping schedule in the Delta so less salt and fewer fish would be entrained in the Delta-Mendota Canal. This would improve the basin salt balance.

Benefits

More uniform application of irrigation water increases crop production and reduces some other inputs. Leaving more water in the source will reduce water quality fluctuations when return flows become a smaller portion of total flow. More stable water quality will benefit instream resources and downstream water users.

Costs and Funding Sources

Capital costs for water-saving technology have been explored and the increased productivity and input savings have been documented, so conservation measures will continue to be installed and paid for by landowners. The limited supplies during recent droughts and resulting from new regulatory constraints to protect endangered species have been a significant

Drainage Management — Irrigation Management

incentive to farmers to conserve supplies so as to maintain land in production. Funds to expedite this gradual process are already available in the form of low-interest loans, and in some parts of Stanislaus, Merced, Fresno, and Kings counties funding is available from the USDA Water Quality Initiative for implementation of conservation practices through the West Stanislaus and Westside San Joaquin Valley Hydrologic Unit Area Projects. To augment existing incentives, a small grant program distributing about \$1 million annually could be used to support demonstration projects designed to motivate more farmers to install water management technology. The funding sources would be in-place State propositions and bonds and water conservation funds from the U.S. Bureau of Reclamation.

Related Activities

Proposed channel restoration in the lower San Joaquin River would lead to more uniform distribution of flow in various channels.

Conflicts and Resolutions

The lands where the greatest need for water conservation technology to be installed are those with the greatest salt problem. The existing priority for funding water conservation measures is based on the amount of water conserved. Sites with very porous soils can demonstrate significant water savings with improved irrigation technology, but may not have a salt problem. Land with more impervious soils and a high water table may not be able to show a large savings in applied water, but might be able to greatly reduce the accumulation of salt with better technology. A new priority could be adopted to emphasize funding conservation measures on an area based on a site's contribution to a better salt balance.

Implementation

This is a long-term action because to increase irrigation efficiency, farmers need to install better systems, which are expensive and limited funds are available immediately. Farmers would also have to await results of research in the use of polymers to improve furrow irrigation. Funds would be needed to cover costs of polymer application unless it is found to be so effective as to allow water users almost immediate recovery of the cost of its use.

Data-gathering and informational aspects of this proposal would be exempt from CEQA. New legislative or quasi-legislative action might be needed to amend authority to fund water conservation to permit priority for salt management rather than quantity of water savings.

Potential implementing agencies would be the Department of Water Resources and U.S. Bureau of Reclamation.

The San Luis Drain was conceived as a means to manage salt in the San Joaquin Basin. The main difficulty with building a drain is that it must discharge somewhere and those living near the most obvious discharge sites are concerned about effects of the discharge. To date, no evaluation of the effects of a drainage discharge has been completed. A drain discharging into the Bay/Delta estuary would be satisfactory, with water quality protection. However, the costs of a drain could challenge the irrigators' ability to pay for it. At some point, when salt accumulation in the basin severely constrains agriculture, a drain discharging to a salt sink such as the estuary or the Pacific Ocean will need to be constructed.

Study the potential to construct an isolated drain to the Bay/Delta estuary to eliminate discharge of saline drainage water into the San Joaquin River. The facility would be sized to convey that increment of drainage needed to obtain salt balance on land that can be economically irrigated but for which the drainage produced exceeds assimilative capacity of the San Joaquin River.

Removing saline and toxic drainage from the San Joaquin Basin would permit the basin to continue as a productive agricultural area.

The U.S. Bureau of Reclamation has studied an isolated drain and estimated its. Costs for the San Luis Drain would need to be adjusted a great deal to account for size differences needed to conform to this proposal.

Funding might be provided by the Bureau of Reclamation and drainage interests. If chemical or biological processes prove feasible, there may be additional cost or savings, depending on efficacy.

Drainage Management — Isolated Drain Out of Basin

Related Activities

Other action proposals by the Water Quality subcommittee are intended to make the greatest reasonable use of the San Joaquin River as the primary conveyance for drainage out of the basin. Significant water management improvements and water table control in the drainage problem areas will minimize the amount of drainage water that needs to be exported.

Conflicts and Resolutions

Conflicts associated with an isolated drain have been discussed at great length. By using the San Joaquin River as the preferred conveyance route for drainage, with water quality control as a major criterion to determine how much can be conveyed by that route, a case can be made for an isolated drain to carry the rest. As long as the San Joaquin River is either ignored and allowed to run dry or abused by routing toxic or excessively saline water down it, it will be difficult to justify an isolated drain. Any implementation of this action would need to be coordinated with water quality objectives in the San Francisco Bay and Sacramento-San Joaquin Delta.

Implementation

The proposal to build an isolated drain out of the basin is a long-term proposal and would need considerable study and justification before it would receive public approval.

Effects on water quality of removing drainage from the San Joaquin River would be beneficial overall. However, with the river's assimilative capacity used more completely, the water would sometimes become more saline or carry higher levels of some trace elements. Conveying drainage via the San Joaquin could be authorized by the Regional Water Quality Control Board under its water quality planning authority without further CEQA requirements, but a new Basin Plan might be needed to permit regulatory enforcement of river management.

The Burns-Porter Act authorized construction of an isolated drain, but legislation would likely be required for funding.

Implementing agencies would be the State Water Resources Control Board, Regional Water Quality Control Board, and U.S. Bureau of Reclamation.

The Department of Boating and Waterways has a program designed to control water hyacinth, primarily in the Delta.

Evaluate methods to eliminate or curb the growth of water hyacinth and other exotic aquatic plants in the San Joaquin River and its major tributaries. Expanding the water hyacinth control program to include the San Joaquin River and its tributaries is necessary for more and safer boating in the San Joaquin Basin. Methods of controlling other aquatic plants should be developed.

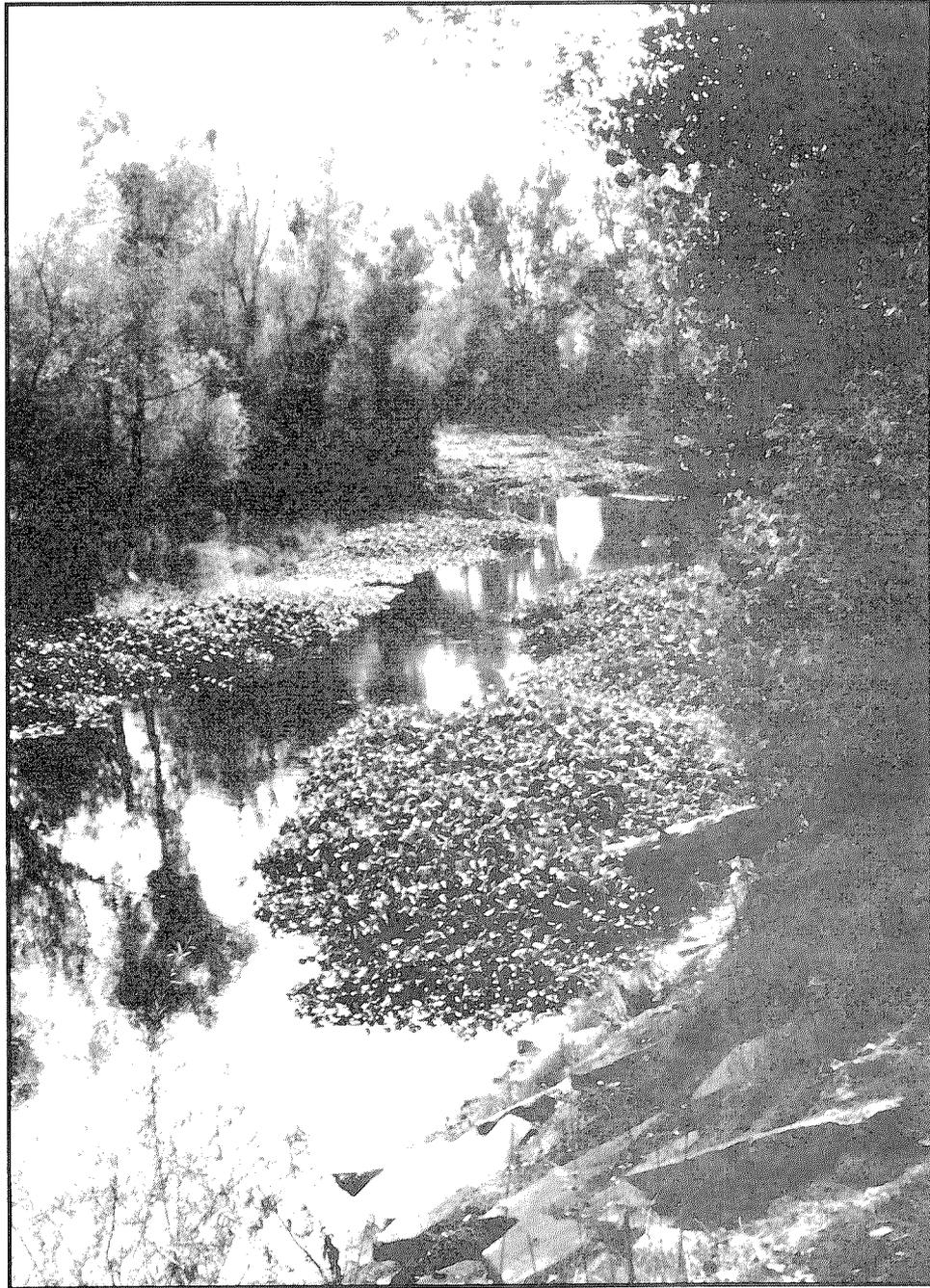
Costs and funding sources have not yet been identified.

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No conflicts have been identified.

This would be a long-term project throughout the region's waterways, although it would expand on current work.

Exotic Aquatic Plant Control



Water hyacinth encroaching on a reach of the Merced River.

Fine Gold Creek Offstream Storage Project

Madera Irrigation District has proposed the Fine Gold Creek Offstream Storage Project to develop on-peak power and additional water supply.

Background

In 1989, Madera Irrigation District requested that the U.S. Bureau of Reclamation investigate a potential Fine Gold Creek pump/storage project. A 350,000 acre-foot offstream reservoir would be constructed on Fine Gold Creek, a tributary of the San Joaquin River within the Millerton Lake watershed. During floodflows, water would be pumped from Millerton Lake into the Fine Gold Creek reservoir for subsequent power and water supply releases.

Study

Evaluate this project as part of developing a comprehensive plan for the San Joaquin Basin, as specified in the Central Valley Project Improvement Act. Fluctuation impacts on Millerton Lake, fish entrainment losses at the pumps, and fish losses on Fine Gold Creek should be evaluated. The Flood Control, Water Supply, Recreation, Fisheries, Wildlife, and Water Quality subcommittees should further evaluate the impacts and benefits of this project. Determine multipurpose benefits and identify sponsors.

Benefits

Depending on how the project is operated, it may provide some flood protection and fishery benefits.

Costs and Funding Sources

According to Madera Irrigation District's 1991 preliminary cost estimate, this project will cost over \$500 million. Studies to complete project evaluation are estimated at about \$3 million. About 3 years will be required to complete the feasibility and environmental compliance studies.

Potential funding sources are CVP water users, Madera Irrigation District members, Pacific Gas and Electric Company, Southern California Edison, and non-reimbursable sources for fish and wildlife and flood control benefits. Central Valley Project Improvement Act funding for the comprehensive plan may be used for evaluation of the proposal.

Fine Gold Creek Offstream Storage Project

Related Activities

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Raising Friant Dam may eliminate the feasibility of this project; raising the water level elevation in Millerton Lake reduces the power recovery head for this project.

Defining flood control, water supply, recreation, fish and wildlife, and water quality needs and ways to meet them.

Conflicts and Resolution

The reservoir is not expected to provide recreational benefits, because the water level will have wide and frequent fluctuations. Substantial riparian habitat and wildlife will be lost. Enlarging Friant Dam may negate the feasibility of this project.

Implementation

Potential implementing agencies are the U.S. Bureau of Reclamation, Madera Irrigation District, Pacific Gas and Electric Company, and Southern California Edison.

This study should not be undertaken until a review of the Friant Dam enlargement proposal is completed.

Friant Dam Enlargement

Millerton Lake does not have enough storage capacity to impound unimpaired flows and is a major contributor to floodflows. Additional storage capacity may provide controlled water releases for fish and wildlife enhancement, San Joaquin River water quality improvement, additional water supplies for Madera and Friant-Kern canals, and flood control improvement.

Background

The storage capacity of Millerton Lake is 520,000 acre-feet, with a maximum water surface elevation of about 581 feet. From Millerton Lake, Madera Canal delivers water northward to the Chowchilla River, and Friant-Kern Canal delivers water southward to the Kern River. In the early 1980s, the U.S. Bureau of Reclamation studied raising Friant Dam about 140 feet, with a corresponding increase in reservoir capacity.

Study

Incorporate this long-term project into studies to develop a comprehensive plan for the San Joaquin Basin, as specified in the Central Valley Project Improvement Act. The U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and the Water Supply, Fisheries, Wildlife, Flood Protection, and Water Quality subcommittees should define the project and evaluate costs and benefits. Determine multipurpose benefits and identify sponsors.

Costs and Funding Sources

In 1982, the cost to raise the dam about 140 feet was estimated at \$550 million. Assuming a 3% escalation rate, the present cost would be about \$784 million. A feasibility study would cost about \$3 million.

Potential funding sources are CVP water users and non-reimbursable sources for recreation, fish and wildlife, and flood control.

Related Activities

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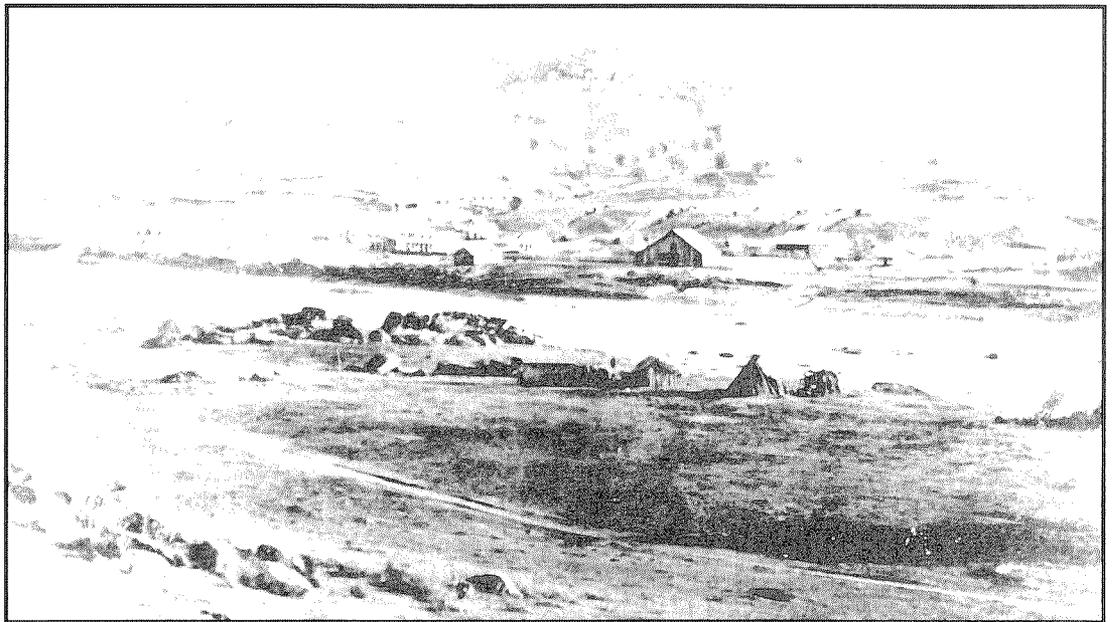
Friant Dam Enlargement

Conflicts and Resolutions

Raising the water level will impact wildlife habitat and infrastructure along the shoreline, as well as possible upstream hydroelectric facilities. Reduced peak flows may impact riparian species that depend on periodic flooding. Raising Friant Dam may eliminate the feasibility of the Fine Gold Creek Project.

Implementation

A potential implementing agency is the U.S. Bureau of Reclamation.



The town of Millerton, in Fresno County, was inundated as a result of constructing Friant Dam. (Photograph taken in 1870.)

In-Basin Water Transfer Facilities

Facilities to convey water supplies from the San Joaquin River and its tributaries to the Delta-Mendota Canal or the California Aqueduct may deliver water to potential buyers without the use of Delta export facilities.

Background

The concept of in-basin water transfer facilities was introduced to the Water Supply subcommittee because of restrictions on Delta pumping arising largely from endangered species and fishery concerns. Supplemental San Joaquin Basin water supplies on the east side would be transported through connecting facilities from the San Joaquin River near Vernalis to the Delta-Mendota Canal or the California Aqueduct, on the west side of the San Joaquin Valley. Existing facilities that convey water from the San Joaquin River may be modified or enlarged, or new conveyance facilities may be constructed.

Study

In-basin water transfer facilities should be further examined by the Water Supply, Fisheries, and Water Quality subcommittees and other basin water users, including those interested in participating in water transfers. Impacts and benefits need to be identified.

Benefits

Benefits would be identified as part of the study.

Costs and Funding Sources

Because this would be a preliminary study to identify interests and concerns, costs need to be determined. Agencies interested in participating in non-Delta water transfers are potential funding sources.

In-Basin Water Transfer Facilities

Related Activities

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Conflicts and Resolutions

Studies need to address downstream impacts, including water quality and quantity, throughout various water year types. Studies must assess the effect of each proposal on quantity and quality of water in the mainstem San Joaquin River and in the southern Delta.

Implementation

Potential implementing agencies would be those interested in participating in non-Delta water transfers.

Instream Flow / Riparian Corridor Relationship

Water rights on many San Joaquin tributaries have been applied for, granted, and used without explicitly requiring minimum instream flows to support fish or riparian habitat. Fish and habitat are destroyed when streams dry up due to excessive diversion of surface flow.

Background

Maintaining riparian habitat and sustaining fish life is difficult without providing some surface flow. However, many smaller streams naturally flow below the surface or become intermittent. Restrictions on diverters will not improve protection for fish or riparian habitat.

Study

Establish a list of streams tributary to or segments of the San Joaquin River; put them in priority order from greatest to least potential for restoration of surface flow; and determine the location, volume, priority, and related water right information for each waterway. When this study is complete, the Department of Fish and Game (or other parties) could petition the State Water Resources Control Board or a court to order owners of diversions on the most restorable streams to permit enough water to pass each facility to support fish and riparian habitat. Where streams could not naturally support fish or have no restoration potential, no action would be taken.

Benefits

Survival of aquatic species and water-dependent species would improve along restored streams. Some threatened and endangered species could benefit.

Costs and Funding Sources

Costs for this study are estimated as equal to the existing and former instream flow program of the Department of Fish and Game — about \$230,000 annually — for up to 10 years, studying two streams each year. Potential funding sources are non-game and sport fish and wildlife funds. New funds from State water-use fees may be available.

Related Activities

- ✓ Improve irrigation management.
- ✓ Conjunctive surface and ground water use.

Instream Flow / Riparian Corridor Relationship

Conflicts and Resolutions

Existing water users rely on all or nearly all of the flow in the San Joaquin Basin. If users near the headwaters of streams are forced to reduce their diversions, users downstream may increase theirs. Unless there is some enforcement program during the dry season, it is unlikely that any water ordered left in the stream will avoid being diverted. A possible resolution is to develop watershed stewardships involving all water right holders. The stewardship would assume the responsibility of "instream watermaster", coordinating the water in the stream to ensure the general benefits actually occur.

Potential public health issues related to possible increased populations of mosquitoes would need to be addressed.

Implementation

This is a long-term proposal. As a study or data-gathering project, the project is categorically exempt from CEQA under Section 15306, Class 6. No legislation would be required.

The study is assumed to be undertaken by the Department of Fish and Game. The potential implementing agency would be a watershed stewardship advised by the Department of Fish and Game, Department of Water Resources, State Water Resources Control Board, and other participants in the San Joaquin River Management Program.



Merced River riparian corridor.

Instream Flow Management

Instream releases in the Stanislaus, Tuolumne, and Merced rivers need to be improved to benefit fish and water quality.

Background

This is a study proposal to optimize management of instream flows. Specifically, this would examine the concept of modifying U.S. Army Corps of Engineers operation of maximum allowable storage capacity to increase stored water supply in the flood season for later release without increasing flood risk. This mode of reservoir operation would entail forecasting runoff in the late spring of above-normal and wet years to achieve higher streamflows in the late summer and early fall of consecutive good water years. Close coordination and agreement among the basin's water managers and the Corps of Engineers would be required.

Study

With the Corps of Engineers, assess the potential for modifying flood reservation rules for eastside reservoirs. If the Corps is receptive, conduct operation studies. Any revised mode of reservoir operation should not increase flood risks. Lessons learned during flood management efforts in 1982-83 and 1986 should be applied to existing flood pool reservations.

Benefits

This mode of reservoir operation would benefit Chinook salmon, instream recreation, riparian corridors, and downstream water quality. Storage of additional runoff with existing reservoirs represents a cost-effective way to meet instream flow improvements without impacting existing water use.

Costs and Funding Sources

If flood reservation rules can be modified, reconnaissance-level operation studies would be conducted to quantify the increased water supply and define conditions under the water would be available. Costs for preliminary studies need to be determined.

Potential funding sources are CVP water users, reservoir owners, and non-reimbursable funds for non-reimbursable benefits.

Instream Flow Management

Related Activities

Concurrent with the operation studies, conduct studies on Chinook salmon, instream recreation, riparian corridor, and downstream water quality needs and benefits.

Conflicts and Resolution

Reduced peak flows may impact riparian vegetation that depends on periodic flooding for survival. However, the additional water yield released as channel maintenance and salmon outmigrant flows would counter this concern. If implemented, this approach may help meet water quality standards and protect the public trust resource.

Implementation

Potential implementing agencies are the U.S. Bureau of Reclamation and reservoir operators.

Mandates include U.S. Army Corps of Engineers flood control criteria.

Land Retirement

Agricultural land in the San Joaquin Basin cannot be operated profitably with insufficient water supply and inadequate drainage.

Background

Recent drought and water quality problems in the San Joaquin Basin have precipitated financial difficulties for a number of farm operations. If this land cannot be farmed profitably, it would make sense to retire them from agricultural use and restore them to natural habitat, then use the water formerly applied to them on other land or for other uses.

Study

The Department of Water Resources and U.S. Bureau of Reclamation have proposed a pilot program to evaluate the potential benefits of land retirement to basin water quality. The Water Quality subcommittee recommends that the pilot program be guided by the conflicts and resolutions (page 141) to address the needs of the San Joaquin River.

Benefits

Water conserved by land retirement in the pilot project is needed in the San Joaquin Basin to address water quality needs. The water could remain available for blending and increasing assimilative capacity, or it could remain in the source, or it could be available for other beneficial uses.

Costs and Funding Sources

The Bureau of Reclamation and Department of Water Resources are developing a pilot program to gather data and test the concept. Costs will be estimated based on the pilot program. Results should be evaluated before pursuing a full-scale retirement program. About 60,000 acres have been identified as drainage impaired and contributing to water quality damage in the San Joaquin Valley. If this land were purchased at \$3,000 per acre and retired under a full-scale program, the cost would be \$180 million. Post-retirement management would costs would depend on land management objectives and could be partly recovered by sales of salvaged water.

The expected funding source for retirement on the pilot scale could come from funds appropriated pursuant to the Central Valley Project Improvement Act. The Advisory Council may wish to consider what source of funds might be appropriate to expand the concept to a larger scale if it proves effective and free of adverse impacts.

Land Retirement

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- Central Valley Project Improvement Act Section 3408(h).

Conflicts and Resolutions

Land retirement should focus first on areas with low-productivity land with the worst drainage problems that contribute surface or subsurface flows to the San Joaquin River. Unless other areas can be shown to be equally important, give priority to the Panoche Fan, which contributes high levels of salinity and problem trace elements to the San Joaquin River. Give priority to areas where water quality effects of land retirement will be accurately monitored and analyzed in flows reaching the river. Limit the acreage and degree of fragmentation of land to be retired in the pilot study so that possible confounding effects of other crop management and land-use practices on adjacent land will not materially affect the ability to quantify results. Designate, fund, staff, and equip an agency to carry out and evaluate a pilot program where benefit to the San Joaquin River can be quantified, and implement the approach on a wider scale if a basinwide program is justified. The fate of any conserved water should be addressed by the Water Supply subcommittee and others.

Implementation

The pilot project proposed here is a short-term proposal for information gathering and concept testing. If justified, land retirement over the larger drainage-impaired area would be a long-term program.

As a demonstration and data-gathering program and with consideration of identified conflicts and resolutions, the pilot project is exempt from CEQA under Section 15306, Class 6. Full-scale land retirement would require an EIR/EIS.

The Central Valley Project Improvement Act and the Hill Bill, respectively, authorize the U.S. Bureau of Reclamation and Department of Water Resources to pursue land retirement, but legislation to provide seed money would be needed for DWR to purchase land.

Implementing agencies would be the Bureau of Reclamation and Department of Water Resources, but local irrigation and drainage districts would be consulted extensively and involved in selecting land and evaluating the effect of retirement.

Montgomery Reservoir Offstream Storage Project

An incremental water supply would help maintain lower water temperatures for fall-run Chinook salmon in the Merced River and to improve water quality and flood protection in the mainstem San Joaquin River.

Background

Montgomery Reservoir, an offstream storage facility, would be constructed on Dry Creek immediately north of the Dry Creek/Merced river confluence near Snelling. The reservoir would store spills from Lake McClure for agricultural and municipal uses. Releases from New Exchequer Dam would improve instream flows and maintain lower water temperatures to benefit fall-run Chinook salmon in the Merced River. The reservoir would have a capacity of 240,000 acre-feet and a surface area of 8,000 acres.

Study

Complete a U.S. Bureau of Reclamation reconnaissance study of an off-stream storage project on Dry Creek near Snelling. Determine multi-purpose benefits, identify sponsors, and initiate a feasibility study. Assess environmental impacts and determine mitigation measures.

Benefits

In addition to fishery benefits, the reservoir may improve water quality in the San Joaquin River and provide flood control benefits. Because of large water surface drawdowns, recreational benefits are not expected to be significant. Operations at the DFG Merced River Hatchery would improve with cooler water temperatures.

Costs and Funding Sources

About \$3 million is needed to complete a feasibility study. The project, including dam, reservoir, conveyances, pumping, and appurtenant facilities, has been estimated to cost about \$135 million. About 3 years would be required to complete the feasibility study and environmental compliance work.

Potential funding sources are CVP water users, the State Water Project, Merced Irrigation District, and non-reimbursable sources for recreation, fish and wildlife, and flood control.

Montgomery Reservoir Offstream Storage Project

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Conflicts and Resolution

Substantial wildlife habitat (vernal pool and riparian) will be lost in the inundated area. Other wetland values would be established. The developed water is expected to be expensive.

Reduced peaks flows may impact riparian species that depend on periodic flooding.

This proposal should indicate the expected rate of diversion to the dam, which would relate to the maximum flood benefit. It should also indicate what yield was assumed in San Joaquin River Management Plan studies.

The Reclamation Reform Act may influence project operations.

Implementation

Potential implementing agencies are the U.S. Bureau of Reclamation, Merced Irrigation District, and the Department of Water Resources.

Obstruction Removal — Dennett Dam and Others

Waterway obstructions can impede adult salmon migration, increase vulnerability to poaching, and intensify predation on juveniles.

Background

The footing of Dennett Dam still remains on the Tuolumne River in Modesto. The Department of Fish and Game has made a mid-channel breach to facilitate fish passage at low flow. At one time, a fish ladder was installed, but it washed away. Fish and Game has done some preliminary scoping of removing the remaining structure.

Study

Evaluate removal of Dennett Dam. Inventory and evaluate other potential obstructions or predation-enhancing structures in area streams.

Costs and Funding Sources

Costs are unknown, but evaluations should identify removal or other remedial measure costs. Various habitat restoration funding sources could be used, including the Central Valley Project Improvement Act.

Obstruction Removal — Dennett Dam and Others

Related Activities

- San Joaquin River Management Program *Salmon Action Plan*, Section 3e.
- Central Valley Project Improvement Act Section 3406 (e)(3).

Conflicts and Resolutions

Conflicts have not been identified.

Implementation

The Department of Fish and Game, Department of Water Resources, U.S. Bureau of Reclamation, and U.S. Fish and Wildlife Service could be primary evaluating agencies.

The Central Valley Project Improvement Act mandates investigation and recommendations.

Other Aquatic Species — Status and Needs

Aquatic species other than fall-run Chinook salmon should be considered in managing aquatic resources of the San Joaquin Regional Management Program area.

Background

Most fishery management programs and activities in the area have focused on fall-run Chinook salmon, but there are many other species. Of about 45 species upstream of the Delta, 20 are native and include several other anadromous species. Due to funding and time constraints, the scope of this report focuses primarily on the salmon fishery. Other species also need attention.

Study

Review status and requirements of aquatic species besides fall-run Chinook salmon. Particular emphasis should be placed on native, anadromous, or special-status species.

Costs and Funding Sources

Costs are unknown, but there has been some preliminary documentation of species status and potential actions. Funding sources are also unknown.

Other Aquatic Species — Status and Needs

Related Activities

- Central Valley Project Improvement Act Sections 3406 (b), (b)(2), (c)(1), (g)(7).
- Department of Fish and Game *Central Valley Stream Action Plan*.

Conflicts and Resolutions

Management decisions may be needed in situations of conflicts among species and other uses.

Implementation

The Department of Fish and Game and U.S. Fish and Wildlife Service would be primary implementing agencies. Agency policies such as “ecosystem management” and laws such as the State and Federal Endangered Species Acts could apply.

Ownership Questions (State Lands Commission)

In developing a comprehensive regional plan, various small projects, including recreational facilities, should be joined in a cohesive pattern. "Patchwork" planning can result in an incomplete and ineffective recreational resource. A major cause of this is unresolved ownership questions.

Background

Advocating the importance and necessity of including public access into city and county general plans would be one component of this study. The regional inventory should assist in identifying gaps in the system. Protecting trail corridors, identifying areas for other types of recreation, environmental protection, and protection of agricultural land are becoming increasingly difficult due to land development and changing land ownership patterns. These land uses, including trails, should be adequately protected through simple fee ownership, easement, or other legal mechanisms.

Study

Recommend and support legislation that will seek resolution of land ownership disputes. (Sample legislation could allow the State Lands Commission to speed up the process that is involved.) This study would identify sovereign ownership of navigable waterways, land, and property and stress creation of buffer and recreation zones through fee title acquisition or easement. Eventually, this would also result in access to scenic vistas and assistance in deterring uncontrolled access on unmanaged land.

Benefits

There would be a benefit in developing a continuous trail plan and new access points, as well as other recreation facilities.

Costs and Funding Sources

Costs and funding sources have not been determined.

Ownership Questions (State Lands Commission)

Related Activities

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- Senate Bill 1429.

Conflicts and Resolutions

The issue of title and location of boundaries along waterways is a difficult matter, involving analysis of complex issues of both facts and laws. Deeds that have been in existence for generations can be disputed by the State Lands Commission. Compensation for lands and past property taxes is difficult to determine.

Implementation

This would be a long-term study and may take at least 2 years to implement throughout the basin. Site-specific boundary studies along the rivers in the study area of the San Joaquin River Management Plan should be prioritized and implemented on an ongoing basis. The first phase, involving the San Joaquin River between Friant Dam and Highway 99, was completed after a 3-year study ending in 1992.

Recreation Access

Managed public access and, therefore, opportunity for outdoor recreation, is lacking in the San Joaquin Basin. Establishing baseline conditions such as identifying potential access points will assist in development of outdoor recreation areas and will allow community and project planning consistent with outdoor recreational goals.

Background

California recreation policy states that recreation facilities and programs shall be designed, operated, and maintained to provide a range of opportunities for all segments of the population. Also, all Californians must have fair and equitable access to recreational opportunities that serve their needs and desires.

Study

With the assistance of government agencies, citizens, and concerned groups, identify and develop sites that would provide greater access for fishing, boating, hunting, and other recreation. Potential access sites could be determined by "holes" discovered in a recreation inventory and map of recreational resources. Development of additional public boating and fishing access points, parks, and trails will also help confine use to specific sites away from designated sensitive areas. It will be necessary to identify potential access sites that will not further degrade wildlife habit nor infringe on nearby landowners and businesses.

Costs and Funding Sources

Costs and funding sources have not been determined.

Recreation Access

Related Activities

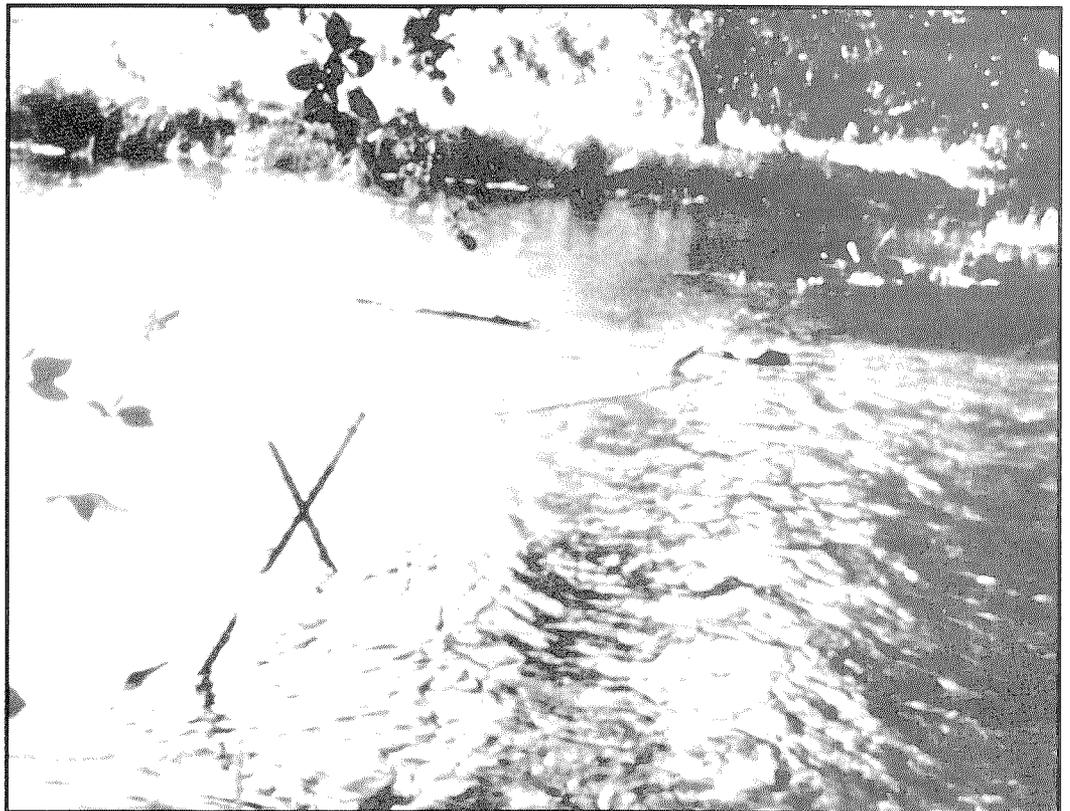
An inventory of public and private recreation areas would establish a baseline condition for future proposals, studies, and reports affecting the San Joaquin Basin.

Conflicts and Resolutions

The potential or perceived destruction of wildlife habitat and private property, littering, and disregard of the rights of private landowners to control land use are primary reasons for opposing the identification and development of public recreation areas. Opposition to appropriating public funds to address possible outdoor program development may stem from a lack of knowledge of all of the values and benefits such programs can bring to a community. However, identification of controlled and managed recreation sites will address the problems (*eg*, trash, vandalism, loitering, and degradation of habitat) associated with uncontrolled and limited access.

Implementation

This is a long-term proposal and will cover the entire basin.



Barbed-wire fence across the Merced River.

Recreation Area Inventory

Significant recreational resources of the San Joaquin River and its tributaries need to be identified and evaluated.

Background

An inventory is needed to establish baseline conditions for future project proposals, studies, and reports affecting the San Joaquin River area. An inventory would also serve as an educational and informational aid to citizens and public agencies. Information obtained in this study could be added to future GIS and atlas plans.

Study

Inventory public and private recreation facilities, areas, access points, and routes along the various river corridors by type, acreage, amount of use, and other applicable data.

Costs and Funding Sources

Costs and funding sources have not been determined.



Canoers on the San Joaquin River below Friant Dam.

Recreation Area Inventory

Related Activities

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A recreational inventory could be part of a larger-scale San Joaquin River and tributaries atlas. The complete atlas would also include flood control facilities, major diversion facilities, riparian habitat, designated critical habitat areas, parcel numbers, State and Federal land along the rivers, reclamation and levee districts, river miles, and 100-year-flood plains. The U.S. Bureau of Reclamation plans to develop an atlas, and the San Joaquin River Management Program should recommend that it contain all features requested by the subcommittees.

Conflicts and Resolutions

There appear to be no conflicts with completion of a recreational inventory.

Implementation

This is a short-term proposal and will cover the entire basin. A 12- to 24-month period would seem appropriate to implement and complete this proposal. Maintaining and updating the inventory would make this a long-term proposal.

Recreation Impacts on Fish and Wildlife Habitat

Recreation development can be hindered by those who believe recreation inevitably leads to destruction of fish and wildlife habitat. As sensitive natural habitats are identified, it is important to determine both adverse and beneficial impacts of passive and active recreation.

Background

Fish and wildlife and their habitats are often negatively affected by increased development and use of natural lands and systems. Protecting the quality and quantity of fish and wildlife habitat while meeting the recreational needs of people in the San Joaquin Basin requires additional research, study, and care.

Study

Study recreation impacts on various fish and wildlife habitats. Document the adverse effects of unauthorized, uncontrolled, or excessive use by the public to help in developing additional recreational sites. Information gained from these studies can be used to eventually develop and implement recreation programs compatible with fish and wildlife enhancement programs.

Costs and Funding Sources

Costs and funding sources have not been identified.

Recreation Impacts on Fish and Wildlife Habitat

Related Activities

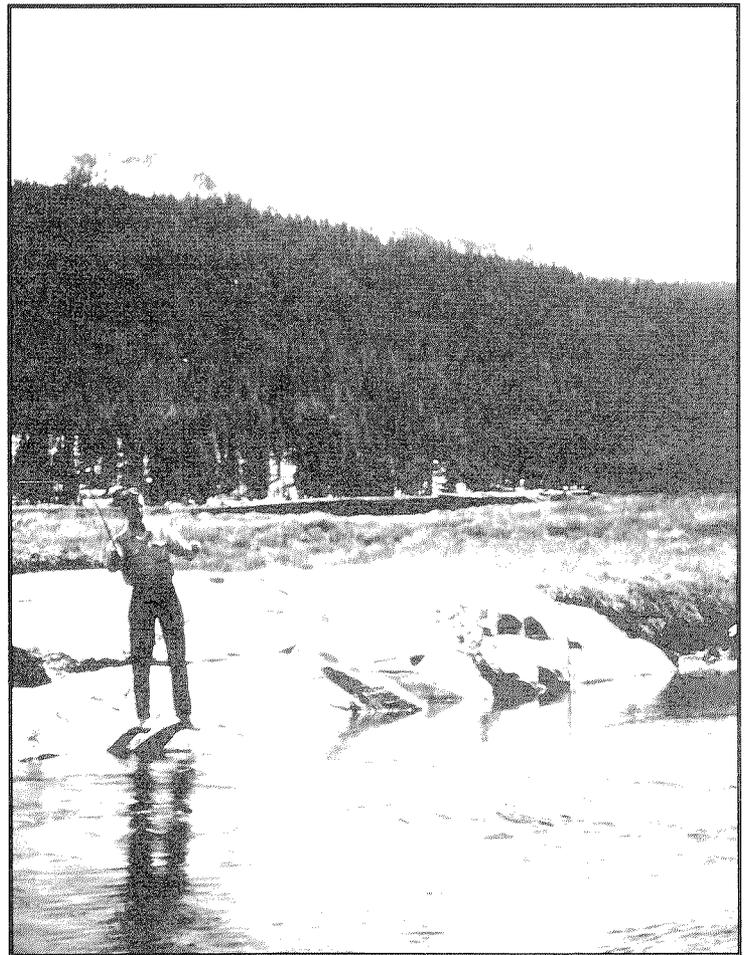
Although the environmental review process will usually cover significant recreational elements for projects in the study area, additional studies would probably be necessary.

Conflicts and Resolutions

No conflicts have been identified.

Implementation

This would likely be a short-term effort, implemented and completed within 2 years.



Fishing on the Tuolumne River.

Salmon Fishery Re-establishment

Releases are needed from Millerton Lake to re-establish a salmon fishery in the upper San Joaquin River.

Background

Section 3406 (c) (1) of Central Valley Project Improvement Act requires that:

“Secretary of the Interior, shall by not later than September 1996: develop a comprehensive plan, which is reasonable, prudent, and feasible, to address, fish, wildlife, and habitat concerns on the San Joaquin River, including but not limited to the streamflow, channel riparian habitat, and water quality improvements that would be needed to re-establish where necessary and to sustain naturally reproducing anadromous fisheries from Friant Dam to its confluence with the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.”

There may be opportunities to coordinate operation of Friant Dam and Millerton Lake together with the Madera and Friant-Kern canals to provide downstream fishery releases. Using the Fish and Wildlife Service Instream Flow Incremental Methodology and with participation by the Department of Fish and Game, it may be possible in some water years to alter operation of the Millerton Lake system to provide either spring or fall pulse flows, or possibly year-round flows, for Chinook salmon improvement downstream of the Merced River confluence and improve the fisheries upstream.

Study

The U.S. Fish and Wildlife Service and Department of Fish and Game should conduct a reconnaissance-level, pre-feasibility study to further investigate the potential of this project. The Flood Control, Water Supply, Recreation, and Water Quality subcommittees should evaluate impacts and benefits of the project. Determine multipurpose benefits and identify sponsors.

Costs and Funding Sources

This is expected to be an evaluation, with a decision within the next 5 years. Study cost is expected to be about \$1 million.

Potential funding sources would be non-reimbursable funds.

State funding is necessary for active participation in this important plan.

Salmon Fishery Re-establishment

Related Activities

Defining flood control, water supply, recreation, and water quality impacts and corrective or enhancing measures.

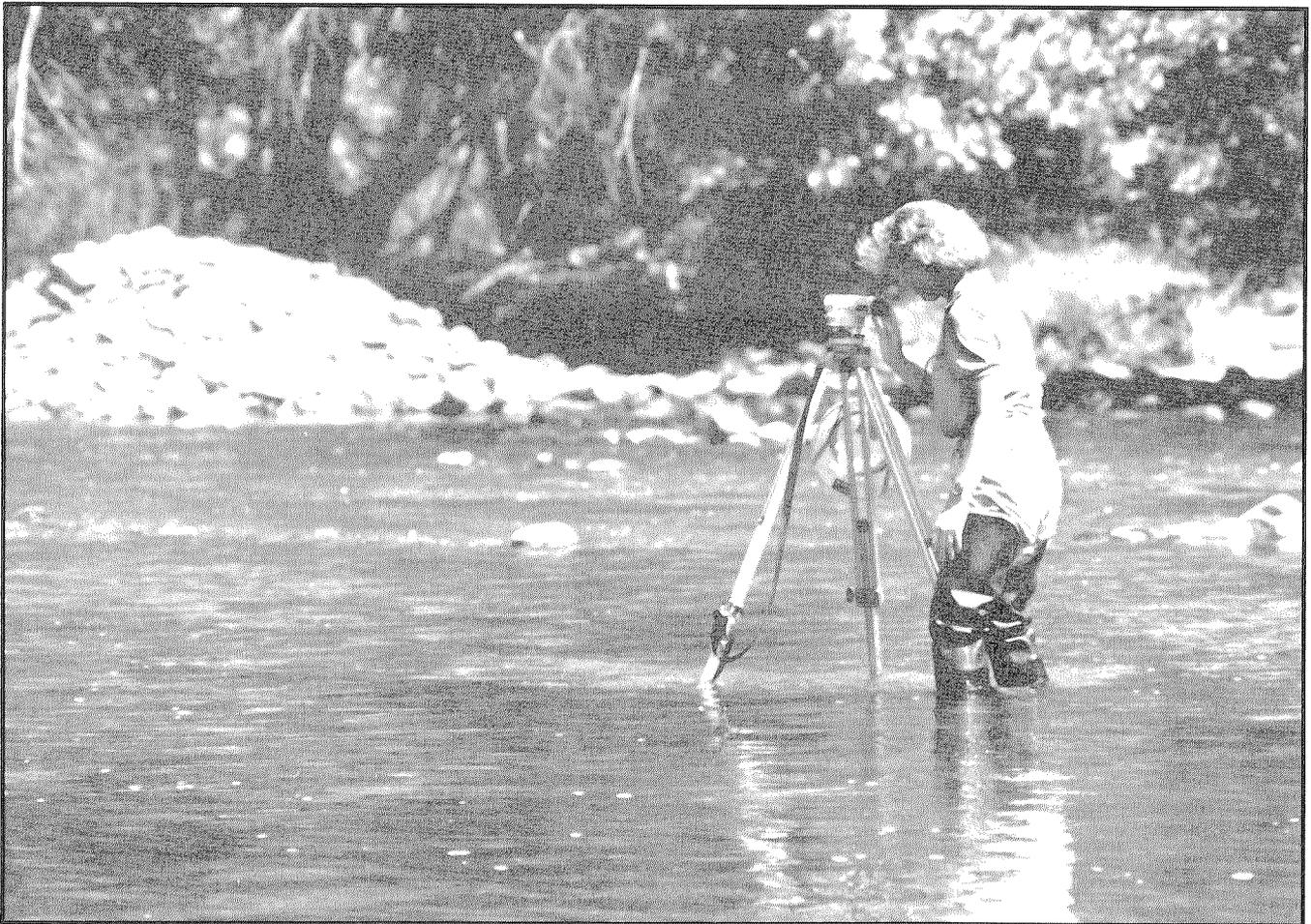
Conflicts and Resolutions

The study needs to clarify whether there is to be reallocation of water or improved multiple use; water management changes should be clarified. The Department of Fish and Game has no funding for this study.

Implementation

Potential implementing agencies are the U.S. Fish and Wildlife Service, U. S. Bureau of Reclamation, and Department of Fish and Game.

Mandates are contained in the Central Valley Project Improvement Act.



Surveying for gravel restoration work to improve salmon spawning, Merced River near Snelling.

Salmon Marking, Natural Production

Efforts to protect and manage San Joaquin River Chinook salmon stocks are hampered by lack of data on factors such as straying, relative impacts and mechanisms of mortality, and relative abundance of natural and hatchery-produced fish.

Background

Hatchery fish can be marked for use in a variety of studies, but many conclusions may not be directly transferable to wild fish. There is no marking program for naturally-produced fish in San Joaquin River tributaries. Such a marking program could provide valuable data on incidence of straying, relative abundance of hatchery and naturally-produced fish, and relative contribution to ocean commercial and recreational fisheries. It may also clarify the reliability of using study results based on hatchery fish releases to emulate natural fish and determine their habitat requirements.

Study

Design and implement a program to mark naturally-produced Chinook salmon smolts in the Stanislaus, Tuolumne, and Merced rivers.

Benefits

Depending on design, marking studies can provide information on relative abundance of hatchery and naturally-produced fish in harvest and escape-ment, potential impacts of ocean fisheries on naturally produced fish, relative effects of various mortality factors, and straying. This will allow fishery managers to make more informed decisions on actions required to restore and protect San Joaquin salmon stocks.

Costs and Funding Sources

Costs are yet to be determined. Potential funding sources include sections of the Central Valley Project Improvement Act pertaining to monitoring. New funds may be available from State water-use fees.

Salmon Marking, Natural Production

Related Activities

Results of this study could contribute to more effective implementation of other fisheries-related actions. Results of tagging studies will also have utility for monitoring and refining the Central Valley Project Improvement Act Anadromous Fish Restoration Program.

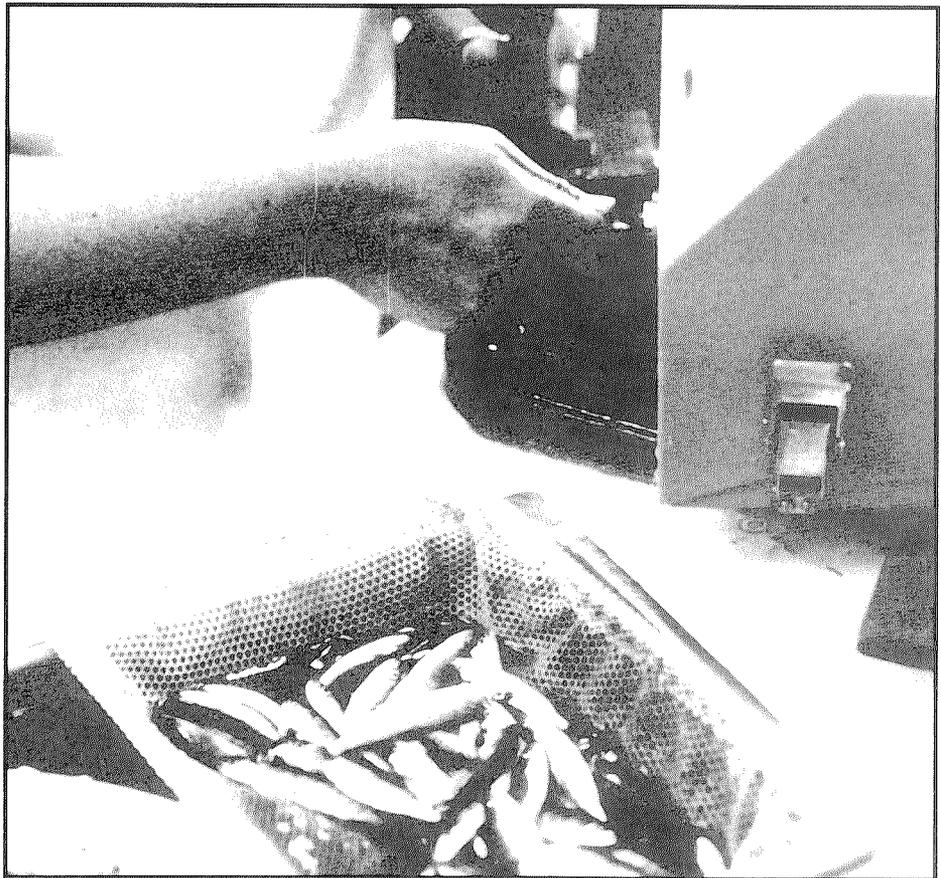
Conflicts and Resolutions

No conflicts have been identified.

Implementation

A tagging study could be implemented relatively quickly, acquiring enough data to make informed management decisions. Environmental documentation will not be required. State legislation is probably not required.

Implementation would require cooperation between State and Federal fishery agencies; Department of Fish and Game would probably be the lead agency.



Tagging hatchery juvenile salmon

Salmon Trapping and Moving (Juveniles)

If other measures do not adequately improve survival of juvenile salmon, then trapping and moving juveniles should be considered.

Background

San Joaquin Basin Chinook runs have totaled less than 3,500 since 1989. Delta water exports affect San Joaquin outmigrant populations more directly than Sacramento stocks. Another contrast is that most of the San Joaquin Basin's water supply is used or exported outside of stream channels. Dry years (7 of the last 8 years) particularly exacerbate conditions for juvenile salmon survival throughout the San Joaquin Basin. Trapping and rearing, moving, or relocating juvenile salmon are methods that may be employed to improve survival. Some limited fry trapping and rearing has been done by the Department of Fish and Game in recent years, but primarily to obtain additional salmon for use in tagged smolt survival studies and bolster smolt or yearling releases. It has not been used as a management strategy to restore the fishery.

Study

Evaluate needs, opportunities, and methods to assist juvenile salmon rearing, survival, and outmigration. Review results of similar programs in the Columbia Basin and other areas.

Costs and Funding Sources

Costs are unknown, but can be capital and labor intensive. Funding sources could be various mitigation and restoration programs if these measures can be proven effective.

Salmon Trapping and Moving (Juveniles)

Related Activities

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Salmon Straying Reduction (Adults)	96
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- San Joaquin River Management Program *Salmon Action Plan* Section 41.
- Central Valley Project Improvement Act Section 3406 (b)(1).

Conflicts and Resolutions

Any program involving direct human intervention is controversial. This evaluation would need to consider aspects such as genetic concerns, much like any artificial production or supplementation proposal. So far, however, measures such as these have not been effective management strategies in the long run.

Implementation

The Department of Fish and Game and U.S. Fish and Wildlife Service are the primary agencies. This is a study only, which could be part of Central Valley Project Improvement Act investigations.

Shaded Riverine Aquatic Habitat Inventory

Fragmentation and insufficient quantity of remaining shaded riverine aquatic cover is resulting in loss of species numbers and community diversity.

Background

Shaded riverine aquatic cover is in the interface of riparian vegetation and riverine habitat. The productive interaction and synergism of terrestrial and aquatic habitat types associated with SRA cover results in a valuable cover for fish and other aquatic organisms, providing a variety of micro-habitats with various flows, depths, cover, and food production. Instream cover such as vegetative debris provides a food source and spawning substrate for a variety of aquatic species.

Under pre-settlement conditions, over 900,000 acres of riparian forest and woodland existed in the San Joaquin Valley. The historical extent of riparian habitat in the San Joaquin Valley has been reduced by an estimated 96%. At least half of the remaining riparian vegetation has been disturbed or degraded. Since SRA cover is closely associated with riparian vegetation, it is reasonable to speculate that a similar reduction of this cover type has occurred. Rip-rapped stream banks, which reduce erosion and are typically kept clear of vegetation, have exacerbated the degraded quality and quantity of SRA cover.

Study

Complete an inventory of shaded riverine aquatic habitat on the San Joaquin River and its major tributaries. Areas meeting the definition of this habitat would be plotted on recent aerial photography of the San Joaquin River and tributaries.

Benefits

Establishment of baseline conditions of this habitat will assist in developing riparian protection and enhancement plans and allow community and project planning consistent with riparian and shaded riverine aquatic habitat preservation goals.

Shaded Riverine Aquatic Habitat Inventory

Costs and Funding Sources

Based on an estimate developed by the U.S. Fish and Wildlife Service in its *Planning Aid Report* to the U.S. Army Corps of Engineers on the San Joaquin River Mainstem Reconnaissance Study, the cost is estimated at \$106,000.

Funding sources have not been identified.

Related Activities

The U.S. Bureau of Reclamation completed a set of aerial photographs of the San Joaquin River in June 1994.

Implementation

This would be a new study and would be updated periodically.

Waste Water Uses

The San Joaquin Basin is accumulating salt in the soil from an imbalance between influx and outflow, with resulting problems for crops, fish, and wildlife. The problem becomes worse when supplies are reduced during drought.

Background

With expanding urban development in the San Joaquin Basin, more treated waste water will be discharged in the basin. Because of limited assimilative capacity in San Francisco Bay, dischargers there are interested in delivering treated waste water to the San Joaquin Valley. Wildlife and fish could benefit by the steady flow available from waste water. Created wetlands and riparian trees are effective at removing nutrients from treated waste water and have been used in places like Arcata to help treat municipal effluent.

The Water Quality Control Plan for Enclosed Bays and Estuaries¹ requires stringent water quality objectives for effluent discharged to San Francisco Bay. With a higher degree of treatment, recycled water with relatively good mineral quality may be used for agricultural irrigation in the San Joaquin Valley.

San Francisco Bay Area waste water and water agencies, in conjunction with the U.S. Bureau of Reclamation, have embarked on a study to explore the possibilities of recycling water from homes and businesses in the Bay Area. It is expected that up to 400,000 acre-feet per year of tertiary treated effluent could be available. One possible solution is to convey some or all of this water to the San Joaquin Valley, blend it with Delta water now being conveyed in the Delta-Mendota Canal, and make it available for irrigation. The project would require construction of collection, treatment, conveyance, and storage facilities.

Water supply in the San Joaquin Valley could be increased substantially, but water quality impacts must be examined and considered. Metals and salts in the recycled water could cause problems for agriculture; for example, the recycled water will contain higher salt loads than Delta water, so irrigating with this water will increase the salinity of agricultural subsurface drainage water, further aggravating the problem of salt loads to the river.

Study

Adopt a policy of accepting treated effluent that helps meet water quality objectives at the point of discharge and receiving basin.

Benefits

Additional water of good quality has the potential for irrigation use and could replace higher quality supplies or permit them to remain in the source to support existing instream uses.

¹ State Water Resources Control Board. November 1990. *Water Quality Control Plan for Inland Surface Water of California and Enclosed Bays and Estuaries of California*.

Waste Water Uses

Costs and Funding Sources

This proposal might be extremely expensive, but alternative discharge locations are also costly.

Related Activities

This source of water would be acceptable only where proposed improvements to Delta channels and operations ensured that the salt load from the effluent was a component of Delta outflow and not an addition to the salt recirculated in the basin.

Conflicts and Resolutions

In determining the place and purpose of reuse, emphasis should be on: (1) purposes of use such that the degraded water quality is fully adequate for the purpose for which it is reused; (2) reuse for that purpose will substitute for use of higher quality water that will then be available for purposes requiring higher quality; and (3) the place and manner of use is such that it will not cause or exacerbate the long-term accumulation, either locally or within a watershed, of salts and other non-biodegradable constituents that must ultimately flow to a salt sink (usually the ocean). Long-term protection of soils and ground water must not be jeopardized.

The major concern with accepting the Bay Area effluent is the amount of salt water that infiltrates into the sewer lines around the bay. Because the San Joaquin Basin already has a problem with excess salts, it would not be prudent to accept excess salts of marine origin in treated waste water unless the salt load being delivered in the recycled water could, after use, be discharged to the ocean without impacting the San Joaquin River and ground water in the San Joaquin Valley. Timing may also be a significant issue, because if the Bay Area salt load entered the river at a time when all San Joaquin flow was being recirculated via the Delta pumping plants, the load would be adding to the salt held up in the basin. Treated waste water would be a valuable resource if Bay Area sewer lines could be lined to prevent sea water infiltration and if water containing the remaining salts could be stored or otherwise managed to prevent its entry into the river at a time when all flows were recirculated.

Implementation

This is a long-term proposal because it would take time to establish conditions under which the discharge would be accepted. It would take still longer to construct Delta barriers to prevent recirculation of added salt and to build the required conveyance, storage, and wetland and riparian facilities.