

1.0 INTRODUCTION

This Initial Fisheries and In-stream Habitat Management and Restoration Plan (FISH Plan) has been developed to better define the long-term ecosystem needs of the lower American River based on current understanding of the stressors affecting priority fish species and their critical habitats. The FISH Plan identifies and prioritizes opportunities for improving the health of the lower American River fish and aquatic habitats, including both new initiatives and modifications to existing management practices. It also identifies key data gaps and research efforts needed to address these gaps. A critical component of the FISH Plan is the strategy for assessing the effectiveness of the recommended restoration actions through monitoring, data interpretation, and adaptive adjustments. As new data regarding the health of the lower American River becomes available, this FISH Plan will be refined and updated to reflect new insights.

This FISH Plan will serve as the aquatic habitat management element (HME) of a multi-agency River Corridor Management Plan (RCMP) that was funded by the CalFed Bay-Delta Program (CalFed) in January 2000. In addition to the aquatic HME, the RCMP also will include a floodway management element, and a recreation management element. Other agencies providing financial support for RCMP development include the Sacramento Area Flood Control Agency (SAFCA) and the Sacramento Area Water Forum (Water Forum).

In addition to serving as the aquatic HME of the RCMP, the FISH Plan also is intended to serve as the Habitat Management Plan (HMP) for the lower American River, as required under the Water Forum Agreement, consistent with the mitigation described and certified in the Water Forum Agreement Environmental Impact Report (EIR) and adopted Mitigation, Monitoring, and Reporting Plan (MMRP).

A working group of stakeholders was established to develop the FISH Plan. This group, known as the Fisheries and Instream Habitat (FISH) Working Group (FWG), was given a two-fold charge: (1) to involve all primary stakeholders in a consensus-building effort, led by an independent third party and supported by a widely respected technical consultant, to develop this initial FISH Plan; and (2) to provide strategic advice to proponents of lower American River fisheries and aquatic habitat management and restoration projects who seek “early start” status for their projects.

FWG members were selected based on input provided by over 45 diverse stakeholders. Recommendations for membership resulted from those names that were consistently repeated during the stakeholder interviews. The FWG composition represents a cross-section of key stakeholder interests including:

- California Department of Fish and Game, Region II
- California Department of Water Resources
- National Marine Fisheries Service
- U.S. Bureau of Reclamation
- U.S. Army Corps of Engineers
- City of Sacramento, Department of Utilities
- Sacramento County Water Agency
- California Department of Fish and Game, Headquarters
- State Reclamation Board
- State Lands Commission
- U.S. Fish and Wildlife Service
- City of Sacramento, Parks Department
- County of Sacramento, Department of Planning
- County of Sacramento, Department of Regional Parks, Recreation, and Open Space

- American River Flood Control District
- American River Fishing Guides Association
- American River Raft Rentals
- Golden State Trollers
- Save the American River Association
- Sacramento Area Flood Control Agency
- American River Parkway Advisory Committee
- Central California Canoe Club
- CalFed Bay-Delta Program
- City and County Office of Metropolitan Water Planning (Water Forum)

This Initial FISH Plan was approved by the FWG (which includes Water Forum representatives and staff) on October 26, 2001; it has been integrated into the overall RCMP developed under the auspices of the Lower American River (LAR) Task Force.

1.1. PURPOSE AND SCOPE OF THE FISH PLAN

The FISH Plan articulates a broadly shared understanding regarding the management and restoration actions that have been identified as most important to undertake to improve habitat conditions for priority fish species (fall-run chinook salmon, steelhead, and splittail). The FISH Plan is intended to serve as a single blueprint for the restoration of lower American River fisheries and in-stream resources and provide a cohesive framework that can:

- Serve as a locus around which public and private entities working in the lower American River can voluntarily coordinate their efforts to responsibly steward lower American River fish and aquatic habitat;
- Serve as a local stakeholder-established framework for Stage 1 (7-year) CalFed Ecosystem Restoration Program Plan (ERPP) implementation; and
- Assist funding entities in assessing where habitat enhancement funds might most effectively be invested.

Individual fisheries and aquatic enhancement actions, as well as associated and regulatory compliance requirements, will remain the responsibility of individual project proponents. The FISH Plan is not intended to alter agencies' existing rights or responsibilities (e.g., with regard to policy and fiscal decision making). The FISH Plan includes:

- A description of physical and biological trends of the lower American River.
- Appropriate restoration, mitigation, and management actions for priority species and habitats on the lower American River.
- A plan for implementing these management, restoration, and research projects and mitigation strategies, which identifies:
 - Project priorities;
 - Agency roles and responsibilities;
 - A description of technical assistance needed to develop, update, administer and implement the plan and monitor results, including type, amount, and cost of technical assistance; and
 - Cost-sharing and administrative arrangement needed to implement the plan.
- An ecological and biological monitoring strategy for (1) evaluating the effectiveness of proposed restoration/mitigation actions (including the techniques, indicators, and

performance standards to be used); and (2) interpreting the data to assess the effectiveness of FISH Plan implementation.

- Data gaps and recommended actions for a directed research program to improve understanding of the lower American River ecosystem.
- A process for updating the FISH Plan based on adaptive management principles.

In addition, recommendations included in the FISH Plan address several of the existing uncertainties regarding ecosystem function articulated by CalFed (CalFed 2000). These include the following:

- Natural flow regimes;
- Channel dynamics, sediment transport and riparian vegetation; and
- Flood management as an ecosystem tool.

1.2. FISH PLAN STUDY AREA

1.2.1. MOUTH OF THE AMERICAN RIVER TO FOLSOM DAM

The FISH Plan study area is located entirely within Sacramento County in the lower American River "Ecozone." The study area covers the American River corridor from the mouth of the American River at the Sacramento River to Folsom Dam. The corridor is bounded on the north and south by levees in the lower reach and bluffs and high terraces in the upper reach. The lower American River centerpoint coordinates are: 2186696, 331924, California Coordinates, Zone 2, in feet, North American Datum (NAD) 1927.

1.2.2. LOWER AMERICAN RIVER CORRIDOR AND WATERSHED BOUNDARIES

The restoration and management efforts proposed in the FISH Plan are confined within the boundaries of the lower American River corridor as described above. However, it is recognized that, in formulating the goals, objectives, and actions necessary to implement the FISH Plan, the FWG also may consider out-of-corridor habitat influences, where they directly affect the fisheries, aquatic, or riparian habitats of the lower American River.

The American River drains a roughly triangular watershed that is widest at the crest of the Sierra Nevada range, and narrows almost to the width of the river at its confluence with the Sacramento River at the City of Sacramento. Elevations range from 10,400 feet mean seal level (msl) at the headwaters to about 200 feet msl at Folsom Dam, with an average basin slope of 80 feet per mile.

Folsom Dam, a part of the federal Central Valley Project (CVP), has provided flood control, hydropower generation, and water supply storage to the surrounding environs since 1956. The reservoir is kept partly empty during the winter, so that temporary storage is available to regulate the runoff from major storms. The reservoir capacity of 975,000 acre-feet is relatively small compared to the average annual runoff of 2,700,000 acre-feet, but because of the large variability in runoff and the need for continuous releases, the reservoir does not fill completely in many years.

Nimbus Dam, located approximately seven miles downstream from Folsom Dam, serves as a regulating facility for hydropower releases from Folsom Dam. It also serves as a diversion dam for the Folsom South Canal. Its reservoir, Lake Natoma, provides flat-water recreation but no significant water storage capabilities. The lower American River is defined as the 23-mile reach of the river downstream from Nimbus Dam (**Figure 1-1**).

1.3. BACKGROUND

1.3.1. LOWER AMERICAN RIVER TASK FORCE - RIVER CORRIDOR MANAGEMENT PLAN

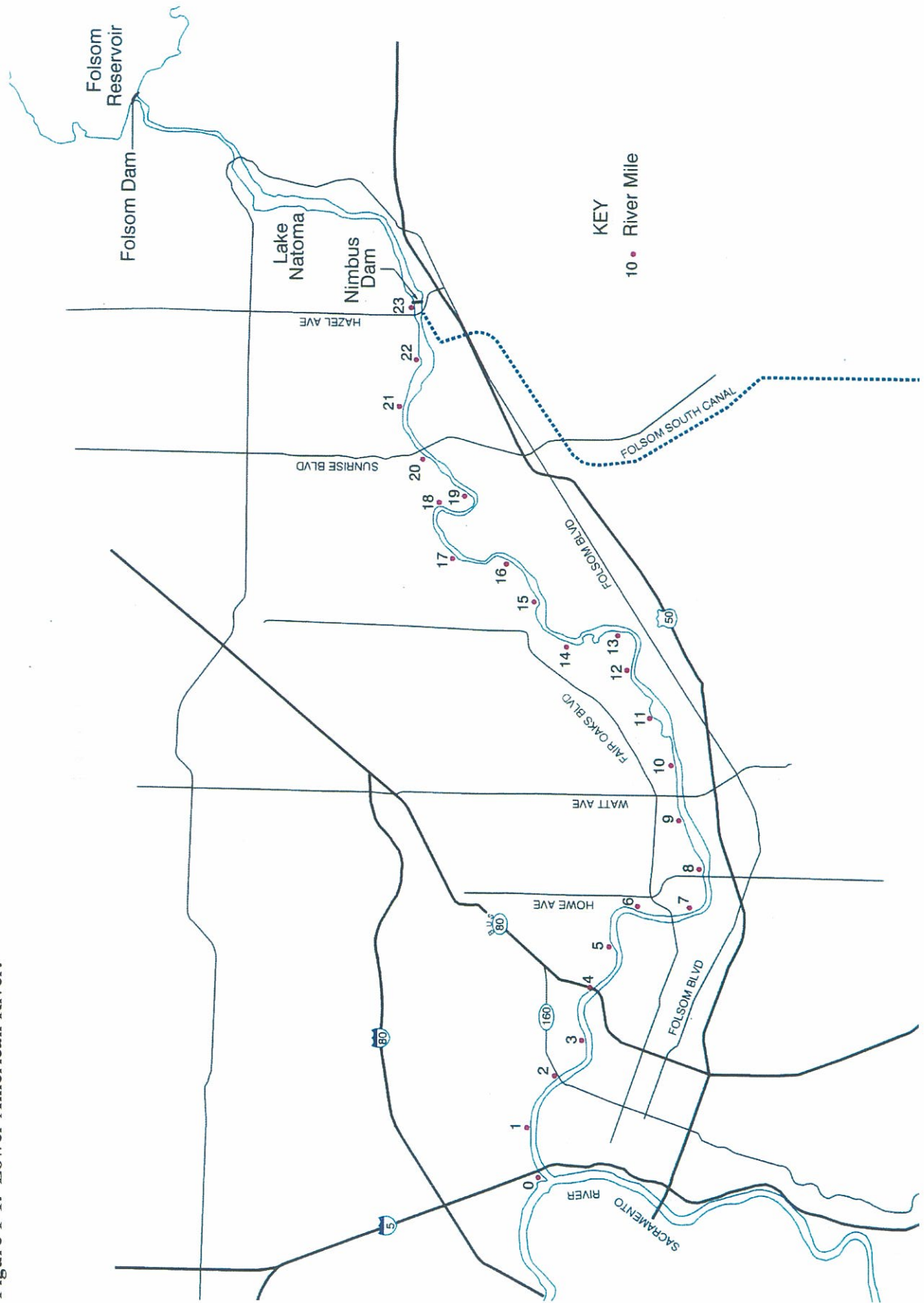
The RCMP has been developed through a stakeholder-driven consensus-building process that has taken place under the auspices of the LAR Task Force, in cooperation with the Water Forum. The LAR Task Force, convened by SAFCA on a monthly basis since 1994, provides a forum for regional coordination on lower American River management among approximately 50 stakeholder organizations. The LAR Task Force's mission is to identify opportunities for improving existing flood control facilities and management strategies along the lower American River, while protecting and enhancing existing environmental and recreational resources within the American River Parkway (Parkway). The LAR Task Force guided the preparation of the RCMP. The need for an RCMP has been identified by numerous interests, including CalFed, the Water Forum, SAFCA, and the Sacramento County Department of Regional Parks, Recreation, and Open Space (Sacramento County Parks).

Building upon earlier efforts to manage the lower American River for multiple beneficial uses, undertaken by the California Department of Fish and Game (CDFG), the Water Forum, the LAR Task Force, and previous LAR Technical Committee Workshops, the LAR Task Force will balance the river's multiple uses through a consensus-based framework. Specifically, the development of the RCMP for the lower American River is intended to: (1) establish consensus among biologists, resource managers, and other technical experts and stakeholders concerning the critical needs of the aquatic species in the lower American River and the priorities for restoration and recovery actions; and (2) provide an integrated planning framework to identify, prioritize, define and implement restoration actions in the lower American River. The RCMP also will serve as the mechanism for updating the American River Parkway Plan (Parkway Plan).

The RCMP has been developed based on information and recommendations generated by four working groups of the LAR Task Force: the FISH Working Group, the Floodway Management Working Group (FMWG), the Bank Protection Working Group (BPWG), and the Recreation Management Working Group (RMWG). Coordination with the [Folsom] Reservoir Operations Working Group (ROWG) takes place through overlapping membership. The RCMP is composed of: (1) the Aquatic Habitat Management Element (HME); (2) the Floodway Management Element; and (3) the Recreation Management Element. The FISH Working Group has developed the HME. The Floodway Management Element has been prepared and managed jointly by the FMWG and the BPWG, while the Recreation Management Element has been developed by the RMWG.

The LAR Task Force integrated the efforts of these working groups in development of the three management elements, as well as providing guidance and review and comment on the draft RCMP.

Figure 1-1. Lower American River.



FLOODWAY MANAGEMENT ELEMENT

The Floodway Management Element of the RCMP has three key programs: (1) Vegetation Resource Management; (2) Facilities Redesign and Relocation; and (3) Anticipatory Erosion Control. FMWG has developed the Vegetation Resource Management and the Facilities Redesign and Relocation programs. BPWG has developed the Anticipatory Erosion Control Program. The FMWG and BPWG have collectively identified the terrestrial habitat restoration needs and priorities of the lower American River.

The Vegetation Resources Management Program serves as a master plan for maintaining riparian and terrestrial habitats, preserving flood conveyance capacity, and accommodating necessary maintenance activities, while remaining consistent with locally adopted recreation and open space goals for the Parkway. The Facilities Redesign and Relocation Program is intended to reduce the impacts of infrastructure maintenance on floodplain habitats, reduce the risk of structural damage due to flooding, and improve the flood conveyance capacity of the lower American River.

The Anticipatory Erosion Control Program addresses potentially critical sites, yet minimizes impacts to the environment by incorporating environmental features. Other, less-critical sites that nevertheless are potential flood control or mitigation sites are addressed as a secondary objective of the BPWG.

RECREATION MANAGEMENT ELEMENT

The Recreation Management Element includes recommendations regarding improvements necessary to facilitate public access to the Parkway and enhance the recreational experience of users, while protecting wildlife and habitat values within the Parkway. To this end, the RMWG element includes recommendations to help mitigate the adverse effects on recreation caused by planned activities within the lower American River corridor. This element also provides for adequate preservation, protection, and restoration of existing Parkway facilities and enhancement of ongoing educational and interpretive activities within the Parkway. Improved public safety and security within and adjacent to the Parkway are also included in the element's charge.

AQUATIC HABITAT MANAGEMENT ELEMENT

The HME includes the FISH Plan, Bibliography, *Baseline Report*, *State-of-the River Report*, and any Early Start Projects (ESPs) that were undertaken concurrent with FISH Plan development. These are described below.

Initial Fisheries and In-Stream Habitat Management and Restoration Plan

The HME focuses on the development of the FISH Plan. The FISH Plan focuses on five fish species of priority management concern, including fall-run chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), splittail (*Pogoninchtys macrolepidotus*), American shad (*Alosa sapidissima*), and striped bass (*Morone saxatilis*). Special emphasis has been placed upon the first three of these species to facilitate compliance with applicable law—particularly, the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA)—and to be consistent with state and federal restoration plans. In particular, this

focus is consistent with: (1) CalFed's 2000 *Ecosystem Restoration Program Plan*, which identifies a vision, restoration actions, and strategies for the lower American River; (2) U.S. Fish and Wildlife Service's (USFWS) 2000 Final *Anadromous Fish Restoration Program (AFRP)*, which identifies specific actions on the lower American River to protect anadromous salmonids; (3) CDFG's 1996 *Steelhead Restoration and Management Plan for California*, which identifies specific actions on the lower American River to protect steelhead; and (4) CDFG's *Restoring Central Valley Streams, A Plan for Action* (1993), which identifies specific actions on the lower American River to protect salmonids. Improvement of habitat conditions for these species of priority management concern will likely enhance conditions for American shad and striped bass, as well as for native resident aquatic species.

A key building block in the development of the FISH Plan was the collection and review of all currently available information on the five priority species associated with the lower American River. While the primary focus of the FISH Plan is on the fish species noted above, consideration of the various natural physical attributes, habitat elements, environmental stressors, and operational management protocols active in the lower American River also is essential in the development of any long-term restoration effort for the lower American River.

Before the FISH Plan could be developed, an assessment of the baseline conditions in the river had to be made. To this end, the FISH Working Group commissioned the preparation of the *Baseline Report* to summarize and present available information on historic trends and current status of the aquatic resources and associated habitats of the lower American River. This report provides the baseline against which the effectiveness of any future restoration efforts may be measured and evaluated. The *Baseline Report* provided a foundation for the FISHWG in developing the FISH Plan. Information contained in the *Baseline Report* will subsequently be used to develop a *State-of-the-River Report* for general audiences.

The FISH Plan includes ecosystem needs and stressors for the priority species and habitats of the lower American River to help identify and select actions for implementation. Actions include new management actions, modifications of existing practices, restoration projects, research projects, and mitigation/conservation measures. A key component of the Plan is its implementation strategy. The implementation strategy represents an important planning tool with which to coordinate the execution of the Plan recommendations. It prioritizes recommended management and restoration actions, and suggests relevant roles and responsibilities. The implementation strategy also describes cost-sharing and other administrative arrangements, as well as needed technical assistance and mechanisms for updating the FISH Plan.

The FISH Plan's ecological and biological monitoring evaluation and adaptive management process will incorporate appropriate metrics, monitoring protocols, and updated population census techniques. Enhanced monitoring efforts are proposed as part of this strategy to systematically measure the responsiveness of the priority fish populations to implemented restoration and management actions, including the Early Start Projects under contemplation. As noted previously, in order to effectively implement the FISH Plan on a long-term basis, adaptive management must be established as the principal process for iterative change. Accordingly, adaptive management principles (e.g., adjustment to targets, funding priorities, and restoration techniques based on an evaluation of preceding and ongoing efforts) will be the foundation for the long-term monitoring effort.

Each of these components of the FISH Plan, including the assessment of baseline conditions, the recommendation and prioritization of restoration actions, the implementation strategy, and the monitoring and adaptive management process, represent a consensus among biologists, resource managers, and other technical experts and stakeholders concerning the critical needs of the aquatic species in the lower American River.

Bibliography

As part of the *Baseline Report* development, a comprehensive bibliography has been produced, including relevant published and unpublished documents on the fisheries and aquatic habitat of the lower American River. This bibliography is computer key-word accessible and represents an important reference source for any planning process regarding the lower American River. The bibliography in its entirety is expected to be made available electronically on the internet in fiscal year 2001/2002.

Baseline Report

The *Baseline Report* provides the essential background information for the lower American River necessary to develop the FISH Plan and identify the specific actions for long-term restoration of the river and its habitats. Key attributes of the lower American River include fish, riparian habitats, water quality, hydrology, fluvial geomorphology, and instream habitats. This report provides a rigorous analysis of published and unpublished documents on the fisheries and aquatic habitats of the lower American River. It also discusses ecosystem functions, characteristics and stressors to the fish species of priority management concern.

State-of-the-River Report

This document will present a condensed version of the key findings of the *Baseline Report* by resource category. It is intended that this report be developed and presented in a user-friendly manner, primarily directed towards the lay reader. While the *Baseline Report* is meant to characterize the existing environmental conditions of the lower American River for planning purposes, the primary purpose of the State-of-the-River Report is community education.

Early Start Projects

ESPs are projects that were initiated while the FISH Plan was under development. When ESPs were brought before the FWG provided project proponents with strategic input related to the utility and design of their proposed projects. However, the FWG chose not to issue approvals nor disapprovals, as they believed this would be beyond their authority. In reviewing proposed ESPs, the TSC and FWG gave feedback as to whether the projects reflected the attributes sought by FISH Plan-recommended actions, including the following: (1) offers high scientific merit/data benefits; (2) addresses the needs of priority management species; (3) addresses a severe stressor; (4) results in multiple or ecosystem benefits; (5) leverages benefits; (6) does not preclude other key restoration opportunities; and (7) is supported by the professional judgment of the TSC members.

1.3.2. WATER FORUM AGREEMENT AND HABITAT MANAGEMENT ELEMENT

The HME for the lower American River, combined with other elements of the Water Forum Agreement, fulfills one of the Water Forum's two coequal objectives: to preserve the fishery,

wildlife, recreational, and aesthetic values of the lower American River. The HME contains five programmatic components that together address river flow, water temperature, physical habitat, and recreation issues for the lower American River. These programmatic components include the Habitat Management Plan, habitat improvement projects that benefit the lower American River ecosystem, monitoring and evaluation efforts, project-specific mitigation and/or conservation measures, and lower American River recreational activities.

As delineated in the Water Forum Agreement, the Habitat Management Plan is to include descriptions of reasonable and feasible projects that could be implemented to avoid and/or offset potential impacts to the lower American River fish and riparian resources due to the increased surface water diversions defined under the Water Forum Agreement. The Habitat Management Plan also is to identify and define the following:

- Performance standards to be used as indicators of the health of the lower American River;
- Conceptual (e.g., Mitigation banking or other) and technical framework for the Habitat Management Plan;
- Schedule and technical assistance required for development, implementation, and monitoring of the Habitat Management Plan;
- The manner with which the Habitat Management Plan will be coordinated with other programs, plans, initiatives, and/or mandates that affect the lower American River ecosystem;
- Logistics and responsibilities associated with administering the Habitat Management Plan;
- Implementation priorities, strategies, and schedules for the proposed projects;
- Lead organizations for implementation of each project;
- The manner with which the Habitat Management Plan could serve as the framework for addressing ESA and CESA requirements; and
- Cost-sharing obligations and specific funding commitments.

The FISH Plan serves as the Habitat Management Plan for the lower American River as required under the Water Forum Agreement, consistent with the mitigation described and certified in the Water Forum Agreement EIR and adopted MMRP.

1.3.3. CALFED BAY-DELTA PROGRAM

CalFed is a cooperative effort among state and federal agencies and California's environmental, urban, and agricultural communities. It was initiated in 1995 to develop a long-term strategy to restore environmental health and resolve water management problems in the Bay-Delta, and its numerous watersheds. In January 2000, CalFed approved funding for 31 restoration projects in the Bay-Delta estuary and its watershed under the federal Bay-Delta Act and California Proposition 204. Projects were selected from a pool of 226 proposals submitted to CalFed in April 1999. The lower American River RCMP development project was among those approved and partially funded by CalFed, with additional funding by the Water Forum and SAFCA.

The lower American River and its watershed have been recognized as important components in the pursuit of CalFed's vision and objectives for ecosystem restoration throughout California. Based on the core involvement of local, state, and federal agencies, as well as business and community groups, the comprehensive RCMP will serve as the planning framework that will

allow local entities to coordinate their management activities related to the lower American River and to assist CalFed in evaluating appropriate lower American River restoration actions.

The RCMP will provide for the following desired outcomes:

1. Improved coordination and assistance among community organizations, public trust resource managers, local businesses, and local, state, and federal agencies by the FWG.
2. Development of monitoring protocols and the application of adaptive management principles.
3. Improved river stewardship, reflecting enhanced riparian and aquatic habitat conditions, as well as enhanced flood management characteristics.

1.4. RELATED PLANS

1.4.1. FLOODWAY MANAGEMENT PLAN

The Floodway Management Plan (FMP) was developed in 1988 by SAFCA and a diverse group of stakeholders on the lower American River including local community and conservation groups in order to balance the needs of the flood control system with the needs of other competing resources. The FMP includes a floodplain management program aimed at restoring ecological processes, functions, and aquatic/riparian habitats that benefit important Bay-Delta fisheries (e.g., chinook salmon, steelhead, American shad, and splittail), while promoting the open space values of the local community and providing an acceptable level of flood control for the City of Sacramento. The RCMP is intended to provide the necessary framework through which the FMP, as well as the FISH Plan, will be implemented.

1.4.2. AMERICAN RIVER PARKWAY PLAN

The Parkway Plan includes important elements, such as flow management, fisheries and associated aquatic habitats, public open space, and flood control. The Parkway Plan, however, has not been updated since 1985 when the County of Sacramento and State Legislature adopted it. Accordingly, its plan elements do not necessarily reflect or incorporate the related planning efforts that have unfolded over the ensuing 16 years. The RCMP is intended to provide the foundation for an updated Parkway Plan, which would serve as the formal vehicle reflecting the support of both the City and County of Sacramento and the State Legislature for incorporating ecosystem restoration into a multiple use management program for the lower American River.

1.4.3. CALFED: ECOSYSTEM RESTORATION PROGRAM PLAN

Under CalFed's ERPP, the vision for the Lower American River Ecological Management Unit focuses on restoring important fish, wildlife, and plant communities. Restoration efforts should emphasize benefits to naturally spawning chinook salmon and steelhead populations, which co-exist with non-native American shad, striped bass, and hatchery stocks of chinook salmon and steelhead.

To accomplish this vision, CalFed recommends restoration and re-initiation of the ecological processes and functions that create and maintain habitats for fish, wildlife, and plant

communities along the lower American River. The ERPP has identified the following ecological processes as desirable for the lower American River:

- Maintenance of natural streamflows in creeks to support riparian habitat and associated species;
- Re-distributing and/or supplementing gravel to continually replenish the supply of gravel needed by chinook salmon and steelhead for spawning habitat;
- Preserving natural floodplain processes by allowing winter-spring flows to overflow into riparian and wetland habitats; and
- Providing cooler spring-through-fall water temperatures by protecting and enhancing streamflow, enhancing riparian vegetation along creeks, reducing warmwater discharges to creeks, and reducing diversions from creeks.

From a habitat restoration perspective, the ERPP has identified several additional visions for protection and/or enhancement of seasonal wetlands, riparian and riverine aquatic habitat, freshwater fish habitat, and essential fish habitat, as well as visions for reducing known ecosystem stressors and addressing the needs of individual species. CalFed recognizes that many diverse actions could be implemented to work toward these visions. With regard to fisheries and aquatic habitat, these actions include improving seasonal flow and water temperature regimes, in-channel and riparian habitats, and modifying fishery regulations and hatchery operations. The RCMP and FISH Plan goals are consistent with the CalFed ERPP overall visions, and their specific visions for the lower American River.

1.4.4. CENTRAL VALLEY PROJECT IMPROVEMENT ACT: ANADROMOUS FISH RESTORATION PROGRAM

Section 3406(b)(1) of the Central Valley Project Improvement Act (CVPIA) of 1992 requires the Secretary of the Department of the Interior 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 to 1991...”*.

Further, Section 3406(b)(1)(A) requires that the program...*“give first priority to measures which protect and restore natural channel and riparian habitat values through habitat restoration actions, modifications to Central Valley Project operations, and implementation of the supporting measures mandated by this subsection...”*. Moreover, this section requires that the program *“...shall be reviewed and updated every five years; and shall describe how the Secretary intends to operate the Central Valley Project to meet the fish, wildlife, and habitat restoration goals and requirements set forth in this title and other project purposes.”*

The USFWS and U.S. Bureau of Reclamation (USBR) are jointly implementing the CVPIA, including Section 3406(b)(1), through development of an AFRP to address the needs of those species identified for restoration actions in the CVPIA. A total of 172 actions have been identified to meet the intent of the CVPIA, 103 of which are assumed to have a high potential for implementation in the near future. For the American River, eight actions have been identified, with five having a high potential for near-term implementation:

1. Develop and implement a river regulation plan that meets flow objectives by modifying CVP operations, using Section 3406(b)(2) water, and acquiring water from willing sellers as needed.
2. Develop a long-term water allocation plan for the American River watershed.
3. Reduce and control flow fluctuations to avoid and minimize adverse effects on juvenile salmonids.
4. Reconfigure Folsom Dam shutters for improved management of Folsom Reservoir's cold water pool and better control over the temperature of water released downstream.
5. Replenish spawning gravel and restore existing spawning grounds.
6. Improve the fish screen at the City of Sacramento E.A. Fairbairn Water Treatment Plant.
7. Modify the timing and rate of water diverted from the river annually to reduce entrainment losses of juvenile salmonids.
8. Develop a riparian corridor management plan to improve and protect riparian habitat and instream cover.

The goals and intent of the RCMP and FISH Plan are consistent with each of these recommended restoration actions.

1.4.5. CALIFORNIA DEPARTMENT OF FISH AND GAME: STEELHEAD RESTORATION PLAN FOR THE AMERICAN RIVER

In 1991, CDFG published *Steelhead Restoration Plan for the American River*. The report identifies two main objectives:

1. Restoring and maintaining naturally produced steelhead as an integral component of the American River ecosystem; and
2. Restoring the population to a level that will sustain a quality steelhead fishery and provide for other non-consumptive uses.

The report focuses on restoring habitat conditions within the lower American River and on supplementing the existing fisheries population with artificially reared fish. The report also recommends that overall CVP operations be adjusted to allow for the elimination of drastic flow fluctuations in the lower American River; identifies water temperature objectives during the spawning, incubation, emergence, and juvenile rearing life stages; and suggests maintenance of a minimum coldwater pool in Folsom Reservoir throughout the summer months. The goals and intent of the RCMP and FISH Plan are consistent with the CDFG Steelhead Restoration Plan.

1.4.6. CALIFORNIA DEPARTMENT OF FISH AND GAME: RESTORING CENTRAL VALLEY STREAMS: A PLAN FOR ACTION

In 1993, CDFG published *Restoring Central Valley Streams: A Plan for Action*. This report was developed to address the long-term protection and maintenance of anadromous fish habitat in Central Valley streams. For the lower American River, this report identified several priorities and recommendations including:

1. Maintaining specified instream flow releases below Nimbus Dam throughout the year;
2. Establishing minimum fall carryover storage at Folsom Reservoir to maintain suitable year-round stream temperatures;

3. Controlling rapid-flow fluctuations to protect anadromous fish fry and eggs;
4. Developing a coordinated multi-agency management plan; and
5. Developing and implementing a continuing program for the purpose of restoring and replenishing, as needed, spawning gravel lost from the construction and operation of CVP dams, various bank protection projects, and other actions that have collectively reduced the availability of spawning gravel and rearing habitat.

The goals and intent of the RCMP and FISH Plan are consistent with this CDFG program.

1.5. RELATED INITIATIVES

1.5.1. ENVIRONMENTAL DEFENSE FUND ET AL. V. EAST BAY MUNICIPAL UTILITY DISTRICT (EBMUD) LITIGATION

The *EDF et al. v. EBMUD* litigation addressed the ability of EBMUD to divert from the lower American River at the Folsom South Canal. A decision was rendered in 1989, but Judge Richard Hodge retained jurisdiction through the Alameda County Superior Court. One of the findings of Judge Hodge's decision ("Hodge Decision") addressed the apparent scientific uncertainty in the body of evidence. The court directed that studies be conducted to reduce the level of scientific uncertainty regarding anadromous salmonid resources in the lower American River, and their environmental requirements.

The intent of the RCMP and FISH Plan in assessing the current health of this ecosystem and identifying areas where either the existing information requires enhancement or corroboration, or whether other important information is currently lacking, is consistent with the goals and objectives of the Hodge Decision.

1.5.2. CALIFORNIA DEPARTMENT OF FISH AND GAME STREAM EVALUATION PROGRAM AND STREAM FLOW AND HABITAT EVALUATION PROGRAM

Since 1991, CDFG has conducted annual redd, emigration, community, and escapement surveys under their comprehensive Stream Evaluation Program. The results of surveys conducted under the Stream Evaluation Program are the primary sources of biological information on the lower American River, and were relied on heavily in the development of the *Baseline Report* and the FISH Plan. The FISH Plan (and its primary technical reference, the *Baseline Report*) provides a comprehensive synthesis of studies conducted under the Stream Evaluation Program from 1991 through 2000.

1.5.3. LOWER AMERICAN RIVER OPERATIONS WORKING GROUP

An operational working group has been established for the lower American River, known variously as the Lower American River Operations Group or, American River Operations Group, or Folsom ROWG. This group includes representatives from the USBR, USFWS, NMFS, CDFG, SAFCA, Water Forum, City of Sacramento, County of Sacramento, Western Area Power Administration (WAPA), and the Save the American River Association (SARA). It generally convenes monthly, or more frequently, with the purpose of providing input to the management of

Folsom Reservoir for fish resources in the lower American River, within the confines of water availability and other operational considerations.

The USBR provides this group with information, such as flows for the prior several months, reservoir storage, projected reservoir inflow, water temperature data, and projected outflows. The ROWG uses this information to plan and develop the annual flow release schedule for Folsom Dam. This takes place on a monthly basis, or more frequently, with the group adapting and refining the projected flow release schedule for the next month, and making necessary adjustments for the remainder of the year.

The ROWG not only provides input into the flow release schedule for Folsom Dam, but also into the adaptive management of the coldwater pool in Folsom Reservoir. The coldwater pool is influenced by numerous factors, not the least of which are inflow, inflow water temperatures, diversions, storage, and the volume of cooler, hypolimnetic waters in the reservoir. Water temperatures in the lower American River also are influenced by these factors, as well as by decisions about which elevation from which to draw water for release from Folsom Reservoir into the Nimbus Hatchery and down the lower American River. The ROWG provides regular input regarding how best to manipulate the shutters on the power penstocks at Folsom Dam to most effectively manage the coldwater pool reserves and provide maximum thermal benefit to downstream aquatic resources.

Operational management prescriptions identified and proposed during the development of the FISH Plan are likely to be reviewed and refined by the ROWG.

1.5.4. LOWER AMERICAN RIVER FLOW MANAGEMENT PLAN

An effort to update a lower American River flow management plan was an outgrowth of several efforts to improve conditions for fish in the lower American River that began in the early 1990s. The SWRCB's interest in protecting public trust resources in the lower American River, included in its 1990 "*Report of Referee*" in the *EDF et al. v. EBMUD* case, contributed to the present effort.

In September 1993, the Water Forum was formed to evaluate water resources and future water supply needs of the Sacramento metropolitan region. One of the two co-equal objectives of the Water Forum Agreement is to "*Preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River.*" Seven elements are put forward in the Water Forum Agreement to support the areas' attainment of the objectives. The third element is "Support for an Improved Pattern of Fishery Flow Releases from Folsom Reservoir." Developing an ecologically based, flow management plan for the lower American River is one of the most important assurances contained in the Water Forum Agreement.

Over the years since completion of the Water Forum Agreement and EIR, the LAR Task Force and FWG have developed, as a first priority action in this Initial FISH Plan and the RCMP (its parent document), a recommendation to "develop and implement an ecologically-based flow management plan for the lower American River, including water temperature management considerations, subject to SWRCB approval" (see Chapter 6). This recommendation is intended to implement the Water Forum Agreement third element.

The Water Forum initiated the process of developing the lower American River flow management plan with the convening of the Fish Biologists Working Group in December 1994. This group developed the initial methodology that matched river releases to varying life cycle needs of the fishery (then referred to as the "F" Pattern). In January 1999, the Water Forum, USFWS, and USBR agreed to continue working on a proposal to be presented to the SWRCB with the intent to update a flow management plan for the lower American River. A technical committee was commissioned to develop this proposal, consisting of individuals representing USBR, USFWS, NMFS CDFG, City of Sacramento, and the Water Forum. The objective of the lower American River flow management plan proposal was to increase the minimum release requirement for the river in conjunction with establishing an adaptive management process for Folsom Reservoir and lower American River operations. Currently, SWRCB Decision 893 (D-893) outlines the minimum flow requirement for the river for all months of the year. However, the USBR operates Folsom Dam to meet more recent minimum flow recommendations consistent with the CVPIA, AFRP, and other relevant habitat management plans geared toward the protection and enhancement of anadromous fish resources.

Development of the flow management plan proposal has focused on evaluation of functional relationships identified in the *Baseline Report*, primarily for fall-run chinook salmon and steelhead, and has emphasized adaptive management. Because development and implementation of a flow management plan will address numerous restoration objectives of the FISH Plan, the FISH Plan incorporates this effort into recommended actions. Because of the relationships between flow and water temperature, the flow management plan incorporates water temperature management considerations, as well as flow.

1.5.5. LONG-TERM REOPERATION OF FOLSOM DAM AND RESERVOIR

Long-term reoperation of Folsom Dam and Reservoir will require an agreement between the local flood control agency (i.e., SAFCA) and USBR to extend the period for establishing at least a 100-year level of flood protection for the greater Sacramento region in the Interim Operation Plan. The agreement would continue the existing interim variable-space flood control diagram for the reservoir, of 400,000 to 670,000 acre-feet flood storage capacity, until completion of flood control improvements at Folsom Dam and along the mainstem of the American River. Modifications of the outlets at Folsom Dam would allow a revised variable flood control diagram reflecting 400,000 to 600,000 acre-feet of variable space storage, yet still provide 100-year flood protection. In addition, mitigation actions associated with the original interim flood control reoperation agreement and the new long-term agreement potentially involve restoration actions within the scope of the FISH Plan.

Identification and implementation of mitigation actions associated with long-term flood control are consistent with the RCMP and the FISH Plan.

1.5.6. U.S. ARMY CORPS OF ENGINEERS' COMPREHENSIVE FLOOD CONTROL STUDY

In response to extensive flooding and damages experienced in 1997, the United States Congress authorized the Corps to provide a comprehensive analysis of the Sacramento and San Joaquin river basin flood management systems and to partner with the State of California to develop master plans for flood management into the next century. The Corps and the State Reclamation

Board are leading a Comprehensive Study to improve flood management and integrate ecosystem restoration in the Sacramento and San Joaquin river basins.

The Comprehensive Study was authorized in October 1997 and initiated with the signing of the Feasibility Cost Sharing Agreement in February 1998. Phase I of the study concluded in March, 1999. The Phase II report will be completed in 2002.

The Comprehensive Study is the only project to address regional flood management issues and develop master plans to incorporate both flood damage reduction and river corridor ecosystem restoration in the Sacramento and San Joaquin River basins. Past and present efforts to address these issues form the starting point for the Comprehensive Study. The Comprehensive Study extends traditional flood management approaches into a broader array of integrated solutions that consider both flood protection and ecosystem restoration along the river systems. Ecosystem restoration efforts contemplated by the plan include:

- Reforest floodplain corridors;
- Protect existing natural physical processes;
- Re-establish suitable hydrologic regime to restore natural physical processes;
- Remove bank protection to restore natural processes;
- Allow riparian forest to reach maturity;
- Restore oxbows—grade and plant abandoned oxbows;
- Use hardpoint bank protection—protect pumps, diversions, etc., locally (e.g., with mini spur-dikes) rather than continuous revetment;
- Restore and reinforce high terraces and berms;
- Raise bypass levees to allow habitat development;
- Raise mainstem levees to allow habitat development;
- Allow habitat development within off-stream storage areas; and
- Create habitat nodes.

Phase II of the Comprehensive Study will continue to expand the public outreach programs, complete model development, formulate and evaluate alternative flood management and ecosystem restoration alternatives, develop programmatic environmental documentation, and identify additional policy and legislative requirements to support implementation. The ecosystem restoration efforts currently contemplated by the Corps' study are consistent with the RCMP and, as applicable, the FISH Plan.