

RECLAMATION

Managing Water in the West



San Luis Drainage Feature Re-evaluation

Record of Decision

March 2007



U.S. Department of the Interior
Bureau of Reclamation

Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

Record of Decision

San Luis Drainage Feature Re-evaluation
Final Environmental Impact Statement

March 2007

Recommend:



Alan R. Candlish
Regional Planning Officer

Date: 3/6/07


Concur:



Michael Jackson
Area Manager, South-Central California Area Office

Date: 3/6/07

Concur:



Susan M. Fry
Regional Environmental Officer

Date: 3/8/07

Approve:



Kirk C. Rodgers
Regional Director

Date: 3/9/07

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I. Introduction

The purpose of the San Luis Drainage Feature Re-evaluation Project is to identify a plan that will meet Federal planning criteria and provide agricultural drainage service to the Central Valley Project's (CVP) San Luis Unit (Unit). Drainage service has been defined as managing the regional shallow groundwater table by collecting and disposing of shallow groundwater from the root zone of drainage-impacted lands and/or reducing contributions of water to the shallow groundwater table through land retirement. The plan selected for providing drainage service is required to provide long-term, sustainable salt and water balance in the root zone of irrigated lands, sufficient to ensure sustainable agriculture in the Unit and the region.

A Ninth Circuit Court of Appeals ruling upheld a District Court finding that the U.S. Bureau of Reclamation (Reclamation) has a statutory duty to provide drainage service to the Unit, and the District Court subsequently issued an Order stating that the "...Department of Interior...shall without delay, provide drainage to the San Luis Unit, pursuant to the statutory duty imposed by section 1(a) of the San Luis Act." To meet the overall purpose and need, the Bureau of Reclamation (Reclamation) used four related Project objectives to develop the alternatives evaluated in the Environmental Impact Statement (EIS):

- Drainage service will consist of measures and facilities to provide a complete drainage solution, from production through disposal, and avoid a partial solution or a solution with undefined components.
- Drainage service must be technically proven and cost effective.
- Drainage service must be provided in a timely manner.
- Drainage service should minimize adverse environmental effects and risks.

The alternative selected in this Record of Decision (ROD) would fulfill the requirements of the Court Order. Implementation of this Project would likely require new authorizing legislation to increase the appropriations ceiling for funding beyond what was authorized by the San Luis Act (Act of June 3, 1960, 74 Stat. 156). Reclamation is finalizing an estimate of the Project costs which is expected to confirm the need for such legislation. Development of any such legislative proposal(s) for presentation to Congress would be subject to requirements of Executive Order No. 12,322, 46 Fed. Reg. 46,561 (1981), and Circular No. A-19 of the Office of Management and Budget, as well as the President's authority to make such legislative recommendations to Congress as he shall judge necessary and expedient.

The drainage study area is located in the western San Joaquin Valley California and consists primarily of the lands lying within the boundary of the Unit. The Unit, as defined by the authorized service area, encompasses the entire Westlands, Broadview, Panoche, and Pacheco Water Districts and the southern portion of the San Luis Water District. Lands immediately adjacent to the Unit, in the Grassland Drainage Area, have also been included. For the EIS, the drainage study area has been subdivided into the Westlands

Water District (Westlands) and the Northerly Area. The total area needing drainage service in the study area is estimated at 379,000 acres.

II. Background

Planning for drainage facilities in the San Joaquin Valley began in the mid-1950s. Drainage service was initially considered at the time Reclamation first studied the feasibility of supplying water to the Unit. In 1960, Congress enacted Public Law 86-488 authorizing construction of the Unit, including an interceptor drain discharging to the Sacramento-San Joaquin Delta (Delta).

Between 1975 and 1979, the San Joaquin Valley Interagency Drainage Program, a joint effort between Reclamation, the Department of Water Resources (DWR), and the State Water Resources Control Board (State Board), was formed to find an economically, environmentally, and politically acceptable solution to San Joaquin Valley drainage problems. This group recommended that a drain be completed to the Delta, terminating near Chipps Island. Based on the San Joaquin Valley Interagency Drainage Program's recommendation, Reclamation initiated the San Luis Unit Special Study to fulfill the requirements for a discharge permit from the State Board for a Federal-only drain. By 1975, an 82-mile segment of the San Luis Drain (ending at Kesterson Reservoir) had been completed and 120 miles of collector drains were constructed in a 42,000-acre area of the northeast portion of Westlands.

In 1983, the discovery of embryonic deformities of aquatic birds at Kesterson Reservoir significantly changed the approach to drainage solutions in San Joaquin Valley. Because of the high selenium (Se) levels found in the drainwater and its effects at Kesterson Reservoir, the San Luis Unit Special Study was suspended. In 1985, following a Nuisance and Abatement Order issued by the State Board, discharges to Kesterson Reservoir were halted and feeder drains leading to the San Luis Drain were plugged.

The San Joaquin Valley Drainage Program (SJVDP) was formed by the Secretary of the Interior and the Governor of California in response to issues at Kesterson Reservoir. This joint Federal/State effort was established to develop solutions to drainage and drainage-related problems. While the initial efforts looked at all possible solutions, a policy decision in 1987 limited studies to In-Valley drainage management measures based on a recommendation from a citizen's advisory committee consisting of water users, environmental advocates, and public interests. The SJVDP's final report (SJVDP 1990) recommended an In-Valley solution that included source reduction, drainage reuse, land retirement, evaporation basins, groundwater management, San Joaquin River discharge, and institutional changes. This report provided a strategy for managing salts through 2040 and stated that eventually salts may need to be removed from the San Joaquin Valley.

While the SJVDP was preparing its recommendations, a 1986 Federal Court Order settled a lawsuit among Westlands, Reclamation, and various classes of landowners and water users in Westlands. Named after one of the parties to the lawsuit, the Barcellos Judgment addressed, among other things, the supply of water to Westlands and the provision of drainage service to Westlands. It directed Reclamation to develop, adopt, and submit to Westlands a plan for drainage service facilities by the end of 1991, leading to preparation

of the San Luis Unit Drainage Program Plan Formulation Report and the related Draft EIS in December 1991.

Several landowners subsequently sued the Department of the Interior (Interior), seeking completion of the master drain to the Delta. These lawsuits were partially consolidated in 1992 to address the common allegation that Interior was required by law to construct drainage service facilities for certain lands in the Unit. In 1995, the District Court issued a partial judgment stating that the San Luis Act established a mandatory duty to provide drainage. The judgment ordered Interior to promptly prepare, file, and pursue an application for a discharge permit with the State Board in order to complete the drain to the Delta. Interior appealed this judgment.

In February 2000, the U.S. Court of Appeals for the Ninth Circuit concluded that Interior must provide drainage service but held that Interior had the discretion to meet the Court Order with a plan other than the interceptor drain solution. In accordance with the Court Order, Reclamation developed a Plan of Action (April 2001) outlining its proposed efforts to provide prompt drainage service considering a variety of options.

The first phase of the re-evaluation, consistent with the Plan of Action, identified a list of preliminary alternatives that met the Court Order to provide prompt drainage service to the Unit. The result of the first phase was the Preliminary Alternatives Report (PAR), San Luis Unit Drainage Feature Re-evaluation, which was published in December 2001. The alternatives described in the PAR all would provide drainage service as required by the Court Order and involved the use of proven technologies.

The second phase of the re-evaluation was the preparation of a Plan Formulation Report (PFR), which included the determination of lands requiring drainage service; the anticipated quantity and quality of drainwater requiring the service; the formulation, evaluation, and screening of the preliminary alternative plans; the description of the final set of alternative plans; and the selection of the proposed action. The PFR was published in December 2002 (Reclamation 2002).

The third phase of the re-evaluation further refined the components of the alternatives, provided additional engineering detail, and includes the completion of the environmental review of the alternatives. The products of this phase are the Final EIS and this ROD.

The PFR identified the In-Valley Disposal Alternative as the proposed action to provide drainage service (during the PFR phase only one In-Valley Alternative, with no land retirement, was under consideration) based on cost, implementation, and other environmental information. Land retirement was considered in the PFR but was excluded as a component of the Federal drainage service alternatives under consideration at that time.

In May, 2003, the Westside Regional Drainage Plan was developed. This plan was a collaborative effort between the San Luis Unit water districts and the San Joaquin River Exchange Contractors Authority to provide drainage relief in portions of the Unit and adjacent areas. Key elements of the Plan include adaptive management to perfect the final drainage management strategy, land retirement of up to 200,000 acres, groundwater management, source control, regional reuse, treatment, and salt disposal. The Plan calls

for identification of sound and effective projects to manage drainage and an accelerated implementation schedule to comply with impending regulatory constraints.

As a result of public and stakeholder input on the PFR as well as the development of the Westside Regional Drainage Plan, Reclamation determined that it would broaden the scope of analysis to include land retirement as a component of drainage service alternatives. On February 5, 2004, Reclamation submitted to the Court an "Amended Plan of Action for Drainage to the San Luis Unit." The amended Plan of Action stated that Reclamation would continue to refine and evaluate all five alternatives described in the PFR for inclusion in the EIS. Additionally, Reclamation would formulate alternative(s) that use land retirement as a method to control drainage need, and would compare costs, benefits, and impacts for alternatives with different amounts of land retirement, because land retirement, by removing land from irrigated agriculture, reduces the contribution of drainage water to the shallow groundwater table and thereby ameliorates the drainage requirements for the lands remaining in production while eliminating the need for drainage on the retired lands.

The Draft EIS was made available for public review and comment during May 2005. Public comments were considered and revisions incorporated into the Final EIS. The Final EIS provided information on the environmental effects of seven drainage service Action Alternatives for the Unit. The Final EIS was completed in May 2006.

III. Decision

Reclamation's decision is to select the In-Valley/Water Needs Land Retirement Alternative as summarized in this document, Section IV, "Alternatives Considered" and fully described in the Final EIS, and to finalize an estimate of the Project costs, which is expected to confirm the need for new authorizing legislation to increase the appropriations ceiling beyond what was authorized by the San Luis Act (Act of June 3, 1960, 74 Stat. 156). Implementation would also require appropriation of funds by Congress for implementation of the alternative and apportionment of such funds by the Office of Management and Budget. Development of any such legislative proposal(s) for presentation to Congress would be subject to requirements of Exec. Order No. 12,322, 46 Fed. Reg. 46,561 (1981), and Circular No. A-19 of the Office of Management and Budget, as well as the President's authority to make such legislative recommendations to Congress as he shall judge necessary and expedient.

The In-Valley/Water Needs Land Retirement Alternative is the plan closest to the Westside Regional Drainage Plan. The In-Valley/Water Needs Land Retirement Alternative includes drainage reduction measures, drainage water reuse facilities, treatment systems, and evaporation ponds, as described in Section IV "Alternatives Considered." It also includes retiring 194,000 acres of land from irrigated farming (44,106 acres have already been retired).

1. Implementation

Assuming Congress provides appropriate authorization and appropriations, the following principles and actions will guide implementation of the In-Valley/Water Needs Land Retirement Alternative:

a. Northerly Area

The Northerly Area has an existing drainage system in place, with drainwater currently being discharged to the San Joaquin River. Drainage service components for the Northerly Area are essentially the same in concept as proposed by the Westside Regional Drainage Plan. Water districts and farmers in the Northerly Area are presently working to implement elements of the Westside Regional Drainage Plan. Reclamation will integrate its implementation activities with the Westside Regional Drainage Plan, and prioritize implementation of the In-Valley/Water Needs Land Retirement Alternative in the Northerly Area so as to eliminate discharges to the San Joaquin River as soon as practicable.

b. Source Reduction

Source reduction actions such as irrigation system improvements, seepage reduction, shallow groundwater management, and drainwater recycling are actions that water districts and farmers are expected to take independently and are not components of the drainage service alternatives that Reclamation would implement. Reclamation evaluated the cost-effectiveness of source reduction actions to determine the reasonable drainwater reduction measures that are expected to be implemented within the drainage area. Reclamation estimated the quantity of drainwater after drainage reduction measures conservatively (i.e., higher) in order to ensure the capacity of drainage facilities were not undersized and that effects on the physical environment are not understated. During implementation, Reclamation will continue to work with the water districts to evaluate and maximize source reduction actions, and hence minimize size of treatment and disposal facilities where practicable.

c. Land Retirement

Land Retirement, a means of reducing contributions of water to the shallow groundwater table, is included in the In-Valley/ Water Needs Land Retirement Alternative as a drainage service component. Retired lands would not receive drainage service, but instead would be offered financial compensation in exchange for placement of a permanent non-irrigation covenant on those lands. Up to a total of approximately 194,000 acres of land in the drainage area will be identified for retirement (of which 44,106 has already been retired.) Additional lands to be retired will include lands in Westlands with selenium (Se) concentrations in the shallow groundwater above 20 parts per billion (ppb), and lands that have been acquired in recent years by Westlands. Reclamation will work in collaboration with Westlands, the U.S. Fish and Wildlife Service (FWS) and others to implement the land retirement component to accomplish the following goals and objectives: 1) achieve the source reduction purposes of the land retirement component, 2) minimize local social and economic impacts, 3) facilitate post-retirement management and maintenance of the lands, and 4) contribute to endangered species recovery and other native habitat restoration goals in the area.

d. Phased Construction and Incorporation of New Technologies

Initial construction efforts will begin in the Northerly Area. Water districts in the Northerly Area are currently operating collection and reuse components of drainage

service. Implementation of the In-Valley/Water Needs Land Retirement Alternative will expand the existing collection and reuse infrastructure and add the treatment, disposal, and mitigation components. In Westlands, the land retirement component will be implemented and initial construction efforts will focus on the collection and reuse components. While proceeding simultaneously with the Northerly Area, implementation of the Westlands components will take longer because no significant drainage system currently exists in Westlands and the drainage system will extend over a large area.

The In-Valley/Water Needs Land Retirement Alternative would provide the various components of drainage service, but individual farmers will install on-farm subsurface tile drains to collect drainwater and pump it into the collector system for further reuse, treatment, and disposal. This is projected to occur over time and therefore, drainage service components would be constructed in two or more phases to meet the projected capacity requirements of the 50-year planning period. Phased implementation provides flexibility in responding to changed conditions and incorporation of technical innovations to improve or optimize treatment and disposal systems.

A primary barrier to achieving In-Valley drainage service during the past decades has been the lack of affordable technologies to reduce or eliminate the associated environmental impacts. Recent advances in technologies for desalination and Se removal are incorporated as integral components of the In-Valley/Water Needs Land Retirement Alternative. During implementation, Reclamation will continue to monitor and investigate enhancements to these technologies, as well as other innovative technologies, and incorporate those that can potentially lower the costs and environmental risks of drainage service.

2. Mitigation

Reclamation has conducted an in-depth evaluation of all reasonable alternatives and adopted all practicable measures to avoid or minimize environmental harm in the formulation of the selected alternative, the In-Valley/Water Needs Land Retirement Alternative. The means for avoidance or minimization of environmental impacts for the overall San Luis Drainage Project is documented in detail in Section 20, Appendix G, and Appendix J1 of the Final EIS.

Mitigation measures adopted by Reclamation as part of this ROD are detailed in the "Mitigation Monitoring and Reporting Plan, San Luis Drainage Feature Re-evaluation, In-Valley/Water Needs Land Retirement Alternative," (Attachment 1). A summary of the mitigation measures is provided below.

a. Project Design, and Facility Operations Measures

Design and Siting Measures – Design features will be incorporated into the planning, sizing, or routing/siting of Project facilities to minimize their adverse environmental effects (e.g., odor control for the bioreactors, installing tailwater collection systems at reuse areas, constructing evaporation basins with steep embankments, providing alternative habitat near evaporation basins to reduce Se-related impacts to migratory birds, and installing groundwater monitoring wells near each basin site).

Operation and Maintenance Measures – Measures will be incorporated into the standard operating procedures of each facility to minimize the long- and short-term biological effects that could result from facility operation (e.g., using portable pumps to facilitate more rapid draining/filling of evaporation pond cells, limiting potential surface water habitats at reuse facilities, developing “wildlife friendly” management plans for selected retired lands). Such measures would also include weed management prescriptions for retired lands.

Construction-related Measures – Actions will be incorporated into construction activities and construction contract specifications to eliminate or reduce potential impacts that could occur during construction. Actions may include impact avoidance strategies (e.g., construction scheduling to avoid critical life stages of selected species, exclusion fencing, limiting disturbance zones); utilizing approved construction techniques and practices (e.g., minimizing excavations at stream crossings, stockpiling topsoil); construction monitoring activities (including utilization of on-site biologists at selected construction sites); and construction site restoration/revegetation (including post-construction monitoring).

b. Mitigation Habitat Site Measures

Mitigation measures will be implemented to mitigate impacts to resident or migratory birds that are susceptible to Se toxicity posed by the Project evaporation facilities.

Alternative Habitat (AH) Measures – Dedicated site measures will be implemented for the purpose of attracting birds away from the hazard exposure by providing more attractive habitat in the nearby landscape and diluting the dietary toxin intake by providing a clean alternative food source. A total of up to 614 acres of AH (307 acres estimated, 307 adaptive management contingency) will be implemented as part of the In-Valley/Water Needs Land Retirement Alternative.

Compensation Habitat (CH) Measures – Residual impacts for exposed birds will be compensated for by the construction of clean, managed CH remote from the evaporation basins. CH includes shallow and deep water components. A total of up to 268 acres of deep water CH (134 estimated, 134 adaptive management contingency) and up to 44 acres of shallow water CH (22 estimated, 22 adaptive management contingency) will be implemented as part of the In-Valley/Water Needs Land Retirement Alternative.

c. Adaptive Management Measures

Implementation of Facility Monitoring and Adaptive Operation and Maintenance Plans – Long-term monitoring activities, contingency plans, and adaptive management plans will be incorporated into the operating plans of individual facilities (e.g., biological and water quality monitoring at evaporation ponds and reuse facilities). Mitigation for the treatment facilities and evaporation ponds will proceed in two phases. Starting with the drainage

service construction, an initial phase mitigation habitat site area will be established and intensive monitoring evaluation studies conducted during three of the first five to seven years of Project operations. Data and information obtained during this initial monitoring phase will be used to adjust the second phase mitigation. Once the second phase adaptive or contingency mitigation is established, routine monitoring will continue at the initial and second phase mitigation habitat sites and the evaporation ponds through the remaining duration of the 50 year total Project design life.

Specialized site evaluation studies will be used to address uncertainty factors in the mitigation habitat site analysis area estimates and to provide information for use in determining the additional habitat area established under the second phase adaptive allowance.

3. Fish and Wildlife Coordination Act

Information regarding the Fish and Wildlife Coordination Act Report for the San Luis Drainage Feature Re-evaluation is included in Section 21 and Appendix M of the Final EIS. In the final Fish and Wildlife Coordination Report, the FWS presented an assessment that included seven recommendations. These recommendations and the manner in which they were (or will be) addressed, are listed below:

- (1) *Adopt a policy that maximizes land retirement (through all appropriate means) on drainage-impaired lands.* This recommendation was not accepted for reasons set forth in this ROD in Section V “Basis of Decision and Issues Evaluated.”
- (2) *Maximize avoidance and/or minimization of Project impacts to fish and wildlife. The FWS prefers a more conservative approach to mitigation, and would encourage Reclamation to include appropriate up-front mitigation prescriptions within the “initial estimate” for mitigation.* Reclamation has adopted measures to maximize the avoidance and/or minimization of Project impacts to fish and wildlife (See Attachment 1).

Reclamation has determined the proposed mitigation to be sufficiently protective for impacts to fish and wildlife. The basis of the mitigation plan is presented in detail in the Final EIS (Volume II, Technical Appendices, Appendix J and Attachment 1). A peer review of mitigation calculations was conducted and determined that the mitigation proposed by Reclamation was sufficiently conservative. The peer review concluded that “the assumption used by (the FWS) that has the greatest effect on estimated needs for mitigation is the application of an Uncertainty Factor (UF) of 2 to the dose-response curve developed for mallards under winter conditions. The dietary threshold for weight loss and mortality in that study was estimated by the authors as 10 to 15 mg Se/kg (Heinz and Fitzgerald 1993). In that study, mallards were subjected to continuous dietary exposures of Se under winter conditions that were considerably more severe than are likely to occur in the San Joaquin Valley. Thus, applying a UF of 2 to the dose-response curve to estimate seems overly conservative.”

- (3) *Consider and include policies, directives, and requirements of all applicable laws, policies and programs.* As with all water resource-related projects, Reclamation will consider these issues during implementation of the drainage service and implement appropriate measures to meet these policies, directives and requirements.
- (4) *Continue to support efforts of the Mitigation Work Group.* Reclamation will involve the Mitigation Work Group in the implementation phase of this Project.
- (5) *Expand the Mitigation Work Group, or form new technical advisory committees to match the shifting Project emphasis.* Reclamation will expand the Mitigation Work Group, or form new technical advisory committees as appropriate, to match the shifting Project emphasis during the implementation phase of this Project.
- (6) *Maximize efforts to assist recovery of threatened and endangered species.* Reclamation will attempt to assist recovery of threatened and endangered species, where appropriate and feasible, in the implementation phase of this Project.
- (7) *Finish section 7 consultation with Sacramento Field Office Endangered Species Division.* Formal Section 7 consultation on the drainage service alternatives has been completed.

4. FWS Endangered Species Act Formal Section 7 Consultation

Reclamation received a Biological Opinion (BO) and Incidental Take Statement dated March 16, 2006, from the FWS providing their opinions regarding the San Luis Drainage Feature Re-evaluation Project and its potential effects on the Federally-listed endangered California least tern, threatened giant garter snake, and endangered San Joaquin kit fox. The BO stated that the FWS concurred with Reclamation's determination that the proposed Project is not likely to adversely affect the Federally-listed endangered Tipton kangaroo rat and threatened California tiger salamander. The FWS concluded that the implementation of the San Luis Drainage Feature Re-evaluation Project is not likely to jeopardize the continued existence of the San Joaquin kit fox, giant garter snake, and California least tern and provided for the incidental take of San Joaquin kit fox, giant garter snake, and California least tern that may result from implementation of the Project. The FWS provided reasonable and prudent measures (including terms and conditions to implement the measures) to minimize take for San Joaquin kit fox and California least tern.

Conservation measures identified in the BO and terms and conditions specified in the Incidental Take Statement will be implemented as detailed in "Mitigation Monitoring and Reporting Plan, San Luis Drainage Feature Re-evaluation, In-Valley/Water Needs Land Retirement Alternative" (Attachment 1).

5. National Marine Fisheries Service Endangered Species Act Informal Section 7 Consultation

Reclamation was notified in writing on April 21, 2006, by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), that they determined that the proposed Project may affect, but is not likely to adversely affect, Federally-listed endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and Central Valley steelhead or their designated habitat, as well as the Southern Distinct Population Segment of North American green sturgeon. Adverse impacts to listed salmonids and sturgeons are not expected due to the use of reverse osmosis, Se biotreatment, and evaporation basins which will reduce Se in effluent to levels at or below amounts considered as toxic to salmonids and sturgeon. Additionally, Reclamation was notified by NMFS that based on their review, considering implementation of the conservation and protective measures described in the San Luis Drainage EIS, the Project will not adversely affect Essential Fish Habitat for Pacific salmon.

6. Cultural Resources and Historical Properties

Prior to construction, a Class III (intensive) cultural resources survey will be undertaken for the Area of Potential Effect (APE) that has not been subject to prior survey coverage meeting current professional and Reclamation standards. The Class III survey will locate and record cultural resources that may be affected by Project activities. Efforts will also be made to determine if any Native-American tribes have sites of religious or cultural significance within the APE. All cultural resources within the APE will be evaluated to determine if they are historic properties, sites eligible for inclusion in the National Register of Historic Places. Effects to significant cultural resources may be mitigated by a variety of methods, depending on the nature of the particular resource. More information regarding compliance with the National Historic Preservation Act for this Project is included in Section 21 of the EIS.

7. Floodplains and Wetlands

All treatment facilities associated with the In-Valley/Water Needs Land Retirement Alternative have been sited outside of known wetland areas. Facilities will be located outside known floodplains to the extent practicable taking into consideration Executive Order 11988 (Floodplain Management). Design and construction of conveyance systems will take into consideration Executive Order 11988 and Executive Order 11990 (Protection of Wetlands).

8. Farmlands of National Importance

Careful consideration of the quality of specific areas of farmland was taken into consideration by Reclamation during the re-evaluation, and an attempt was made to avoid converting such land into other uses where practicable alternatives existed. The long-term national importance of maintaining farmland was a significant factor in selecting the In-Valley/Water Needs Land Retirement Alternative for implementation. The final locations for the reuse areas will be selected during implementation of the Project through site-specific consideration of the quality of farmland to be converted to reuse areas.

9. Native-American Trust Lands

Reclamation reviewed the location of Native-American rancherias, reservations, and public domain allotments in relation to each of the alternatives included in the EIS and no Native American lands were found to be within the outline of the Project area. More information regarding this issue is included in Section 21 of the Final EIS.

IV. Alternatives Considered

A No-Action Alternative and seven Action Alternatives were considered in the EIS. These alternatives are described in detail in the EIS. Action Alternatives included the (1) In-Valley Disposal Alternative, (2) the In-Valley/Groundwater Quality Alternative, (3) the In-Valley/Water Needs Land Retirement Alternative, (4) the In-Valley/Drainage-Impaired Alternative, (5) the Ocean Disposal Alternative, (6) the Delta-Chipps Island Disposal Alternative, and (7) the Delta-Carquinez Strait Disposal Alternative.

No-Action Alternative

Under the No Action Alternative, Federal drainage service would not be provided. The 379,000 acres projected to need drainage service would not have that service available, and farmers would individually pursue cropping practices and drainage control and reuse. Water districts and landowners would continue to address drainage problems within institutional, regulatory, and financial constraints currently in effect and in the reasonably foreseeable future.

Because the Ninth Circuit Court of Appeals ruling required Reclamation to provide drainage service to the Unit, the No-Action Alternative was not considered feasible for implementation.

Action Alternatives

As previously mentioned, the Action Alternatives evaluated in the EIS included the (1) In-Valley Disposal Alternative, (2) the In-Valley/Groundwater Quality Alternative, (3) the In-Valley/Water Needs Land Retirement Alternative, (4) the In-Valley/Drainage-Impaired Land Retirement Alternative, (5) the Ocean Disposal Alternative, (6) the Delta-Chipps Island Disposal Alternative, and (7) the Delta-Carquinez Strait Disposal Alternative.

Components Common to All Action Alternatives

Components common to all the Action Alternatives include (1) on-farm/in-district actions to reduce drainwater through irrigation system improvements, seepage reduction, shallow

groundwater management, and drainwater recycling, (2) drainwater collection systems including Firebaugh sump/DMC drain, and (3) regional reuse facilities (Figure 1).

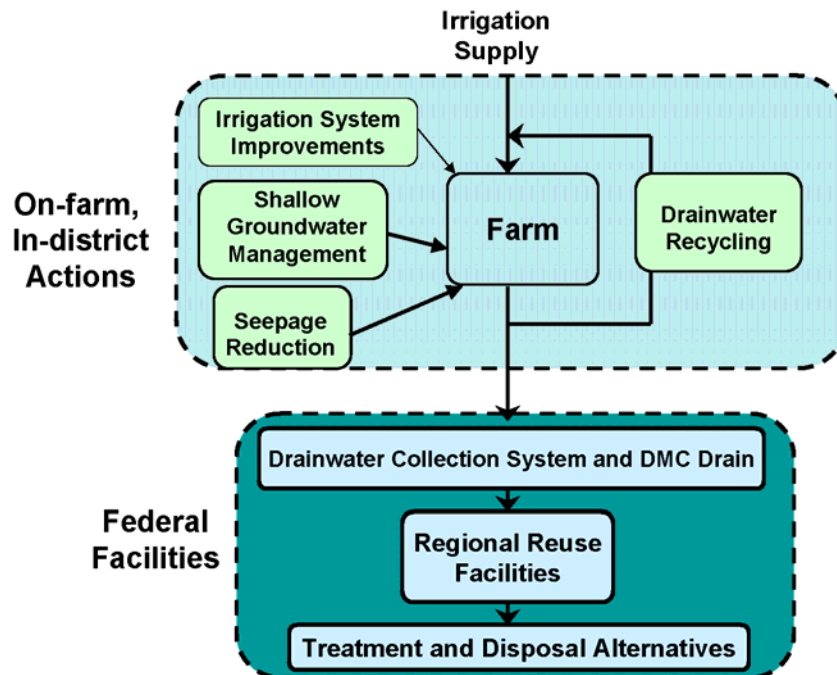


Figure 1 Components of Alternatives

All of the alternatives include some level of land retirement. A minimum of 44,106 acres is assumed to be retired for all of the Action Alternatives (common component). These consist of lands already retired through litigation settlement, and up to 7000 acres already retired through the Central Valley Project Improvement Act (CVPIA) land retirement program.

In-Valley Alternatives – Common Components

All of the In-Valley alternatives would treat drainwater from the regional reuse facilities with reverse osmosis and biological Se treatment before containment in evaporation basins. Reverse osmosis treatment would reduce the drainwater volume by half and produce an equivalent amount of clean product water.

In-Valley Disposal Alternative

The In-Valley Disposal Alternative would include the common components of all of the In-Valley alternatives and would provide drainage service to all lands in the Unit that require drainage. There would be no additional land retirement beyond the 44,106 acres common to all alternatives.

In-Valley/Groundwater Quality Land Retirement Alternative

The In-Valley/Groundwater Quality Land Retirement Alternative consists of retiring the 44,106 acres common to all alternatives plus all the lands in Westlands with Se concentration greater than 50 parts per billion (ppb) in the shallow groundwater and would include the lands recently acquired by Westlands (approximately 38,486 acres),

and 10,000 acres in Broadview Water District in the Northerly Area. This alternative would include the common components of all of the In-Valley alternatives and the land retirement would total 92,592 acres (44,106 acres plus an additional 48,486 acres).

In-Valley/Water Needs Land Retirement Alternative

The In-Valley/Water Needs Land Retirement Alternative would include all features in common with the other In-Valley alternatives and would target retirement of lands with Se concentrations in the shallow groundwater above 20 ppb. The In-Valley/Water Needs Land Retirement Alternative would retire 194,000 acres of land (44,106 acres plus 149,850 additional acres), which is estimated to balance the water needs of the lands remaining in production with the Unit's foreseeable water supply from its CVP contracts and groundwater resources. This alternative was formulated to retire sufficient land to balance water needs with the lands remaining in production in the Unit.

In-Valley/Drainage-Impaired Land Retirement Alternative

The In-Valley/Drainage-Impaired Land Retirement Alternative would include all features in common with the other In-Valley alternatives and would target retirement of all drainage-impaired lands in Westlands. The In-Valley/Drainage-Impaired Land Retirement Alternative would retire 308,000 acres (44,106 plus 263,894 acres), including all of the drainage-impaired lands in Westlands (approximately 298,000 acres) and 10,000 acres in Broadview Water District. Drainage collection, reuse, treatment, and disposal facilities would not be needed in the Westlands drainage-impaired areas. The collection, reuse, treatment, and disposal facilities would be only those needed to serve the Northerly Area.

Ocean Disposal Alternative

The Ocean Disposal Alternative would include common components of all alternatives. Additionally, reused drainwater collected from the regional reuse facilities would be transported by pipeline to the Pacific Ocean for disposal. The pipeline conveyance system would lie within the San Joaquin Valley from near Los Banos southeast to just south of Kettleman City and then extend southwesterly to the Pacific Ocean at Point Estero. An ocean diffuser would be located approximately 1.4 miles offshore, at a depth of 200 feet.

Delta-Chipps Island Disposal Alternative

The Delta-Chipps Island Disposal Alternative would include the common components of all alternatives. Drainwater from the reuse facilities would be treated with biological Se treatment before conveyance by canal and pipeline to the Delta for disposal. Reverse osmosis treatment is not included in the Delta-Chipps Island Disposal Alternative. The canal and pipeline conveyance system would extend the existing San Luis Drain from its current terminus at Mud Slough to the north-northwest through Merced, Stanislaus, San Joaquin, and Contra Costa counties for disposal at the western end of the Delta at Chipps Island. An underwater diffuser would be located approximately one mile from the shoreline at Mallard Slough at a depth of 18 feet.

Delta-Carquinez Strait Disposal Alternative

This alternative has the same route and design elements as the Delta-Chipps Island Disposal Alternative, except that it continues west past Martinez to Carquinez Strait for

disposal immediately upstream of Carquinez Bridge. Approximately 177 miles of pipeline and canal would be installed, including one mile of pipe buried underwater. In addition, about 83 miles of the existing San Luis Drain would be used, for a total conveyance length of 260 miles. The Delta-Carquinez Strait route follows the Delta-Chippis Island route, but continues west along the railroad tracks past Martinez to Carquinez Strait Regional Shoreline to the city of Crockett, where it terminates offshore at a diffuser.

A diffuser would be located approximately 16 miles downstream of the western end of the Delta and one mile from the shoreline at Crockett at a depth of 18 feet.

V. Basis of Decision and Issues Evaluated

The purpose and need for the Federal Action is based on a mandatory District Court injunction directing the Secretary of the Interior to “provide drainage to the San Luis Unit.” In the Final EIS, a No Action Alternative and seven Action Alternatives to provide drainage service were evaluated and their potential environmental consequences identified.

Factors evaluated in the EIS and considered by Reclamation in Selecting the In-Valley/Water Needs Land Retirement Alternative include:

- Effects on Surface Water
- Effects on Groundwater
- Effects on Biological Resources
 - Terrestrial Resources
 - Aquatic and Wetland Resources
 - Federally-Listed Special-Status Species
 - State-Listed Special-Status Species
- Effects on Geology
- Effects on Energy Resources
- Effects on Air Resources
- Effects on Agricultural Production and Economics
- Effects on Land and Soil Resources
- Effects on Recreational Resources
- Effects on Cultural Resources
- Aesthetics
- Effects on Regional Economics
- Social Issues and Environmental Justice

The Principles and Guidelines and the National Economic Development Plan

The Principles and Guidelines (Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, March 10, 1983) state that “a plan recommending Federal action is to be the alternative plan with the greatest net economic benefit protecting the Nation’s environment (the NED Plan).” Under the Principles and Guidelines (P&Gs), the NED alternative is the plan that reasonably maximizes net national economic development benefits, consistent with the Federal objective. In other words, when changes to the productivity of the national economy as a

whole are measured for each alternative, the alternative with the largest positive difference between economic benefits and costs is the NED alternative. The Federal cost of purchasing non-irrigation covenants for retirement component is not considered to be an economic cost under the NED analysis. The NED cost of land retirement is the net farm income forgone as a result of retiring land rather than keeping it in irrigated agricultural production – not the actual cash outlay, or financial cost, of purchasing covenants for land retirement. The cash outlay for purchasing non-irrigation covenants for retirement is considered a transfer payment. This treatment of land retirement costs contributes to the maximum land retirement alternative (In-Valley/Drainage-Impaired Land Retirement Alternative) being identified as the NED alternative.

The Plan Selected for Implementation

Although the In-Valley/Drainage-Impaired Land Retirement Alternative was identified as the NED Plan according to evaluations documented in the EIS, an exception to the P&Gs has been obtained from the Secretary of the Interior and Reclamation has selected the In-Valley/Water Needs Land Retirement Alternative for implementation.

Specifically, this alternative was selected over the NED Plan because:

(1) The NED Plan would remove 308,000 acres – over half of Westlands and almost half of the entire Unit – from agricultural production. Agriculture is a major component of the regional economy and such a large land retirement component is of significant concern to State and local interests. The In-Valley/Water Needs Land Retirement Alternative will retain 100,000 more acres of sustainable agricultural production than the NED Plan, and retain more farm worker jobs in small communities with high unemployment.

(2) The U.S. District Court, upheld by the 9th Circuit Court of Appeals decision, has found that the Secretary of the Interior has a mandatory duty under the San Luis Act to provide drainage service to the Unit. The In-Valley/Water Needs Land Retirement Alternative is the alternative closest to the locally developed Westside Regional Drainage Plan. This alternative is more acceptable to the local community and more likely deemed to constitute “drainage service” as required under the Court Order than the NED Plan.

(3) The In-Valley/Water Needs Land Retirement Alternative will retire sufficient land to balance water needs with the lands remaining in production in the Unit.

VI. Environmentally Preferred Plan

Because the In-Valley/Drainage-Impaired Land Retirement Alternative requires the least amount of evaporation ponds and associated treatment systems, the In-Valley/Drainage-Impaired Land Retirement Alternative was identified as the Environmentally Preferred Plan. During the evaluation, it was determined that the evaporation ponds, construction activities, and reuse areas would create some undesirable environmental effects. However, all of the significant environmental impacts were determined to be mitigable for all of the In-Valley alternatives (see Section 20 of the EIS).

Ocean Disposal Environmental Considerations

Specifically, the U.S Environmental Protection Agency (EPA) ranked the Ocean Disposal as “*Environmental Objections-Insufficient Information (EO-2)*.” This ranking is defined as “*EPA has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other Project alternative (including the No Action Alternative or a new alternative). EPA intends to work with the lead agency to reduce those impacts.*” Actual long-term environmental impacts, related to this alternative, are difficult to assess because there are no long-term studies of the effect of agricultural drainage and Se discharges to the ocean.

Delta Disposal Environmental Considerations

The two Delta Disposal Alternatives were eliminated from consideration as the environmentally preferred alternative for the following reasons: (1) the San Francisco Bay-Delta is the source for approximately two-thirds of the water supply for the State of California, and (2) the Delta has been listed under Section 303(d) of the Clean Water Act (CWA) since 1998 as a water body “*impaired for beneficial uses*” due to Se. Through comments received on the draft San Luis Drainage Feature Re-evaluation, the EPA ranked the Delta Disposal Alternative as “*Environmental Objections-Insufficient Information (EO-2)*.” This ranking is defined as “*EPA has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other Project alternative (including the No Action Alternative or a new alternative). EPA intends to work with the lead agency to reduce those impacts.*”

In-Valley Disposal Environmental Considerations

The four In-Valley Alternatives were ranked by the EPA as “*Environmental Concerns-Insufficient Information (EC-2)*.” This ranking is defined as “*EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.*” The evaporation ponds, construction activities, and reuse areas would create some undesirable environmental impacts; however, through the EIS process and Section 7 consultation with the FWS, Reclamation has determined that these impacts are mitigable.

Comprehensive summaries of environmental effects are contained in the text of the Final EIS at the end of each section for resources potentially affected by any of the alternatives. These summaries contain comparisons to existing conditions as well as to No Action.

VII. Environmental Commitments

Mitigation Measures adopted by Reclamation as part of this ROD are detailed in the “Mitigation Monitoring and Reporting Plan, San Luis Drainage Feature Re-evaluation, In-Valley/Water Needs Land Retirement Alternative,” (Attachment 1). A brief summary

of the Mitigation measures was provided above under the heading “Mitigation” of Section III.

VIII. Comments Received on the EIS

Reclamation published a Notice of Intent (NOI) to prepare an EIS in the Federal Register in October 2001, and held the first in a series of public scoping meetings in Fresno and Concord on November 14 and 15, 2001, respectively. At these meetings, Reclamation provided information on the Court decision prompting the EIS, as well as study plans, options to be re-evaluated, and other important components of the Project. Notices announcing the meetings were mailed to approximately 425 interested individuals, stakeholders, and organizations. Interested parties were encouraged to ask questions and provide comments on issues of concern.

Comments Received During the Scoping Process

Reclamation held a second series of scoping meetings to receive comments from the public on issues that should be included in this EIS in Morro Bay, Fresno, Concord, and Sacramento on January 27, 28, 29 and 31, 2003, respectively, after distribution of the PFR in December 2002. At this series of meetings, Reclamation presented a brief history of the Project; a review of the In-Valley, Delta, and Ocean Disposal Alternatives; an explanation of the evaluation factors and screening criteria that were applied to identify the proposed alternative; and outlined stages in the environmental review process. Reclamation conducted additional public scoping on land retirement alternatives in early March 2004. Reclamation solicited input from the interested parties, which is detailed in the Scoping Report contained in Appendix A of the EIS and summarized as follows:

Public concerns and comments received at the public scoping meetings, as well as those received in response to the NOI, reflected regional preferences for drainage disposal, and a desire among stakeholders to reduce or eliminate potential environmental impacts drainage service may generate, as well as a preference to reduce or eliminate the need for drainage service altogether.

In addition to public scoping meetings discussed above and Interagency Workshops held throughout 2002, Reclamation conducted briefings for a number of local agencies, cooperating agencies, environmental groups, and congressional staff. These briefings are detailed in Section 21 of the EIS, which also contains a complete distribution list of Federal and State elected officials, agencies, organizations, and interested individuals.

Comments Received on the Draft EIS

The Draft EIS was available for review and comment for 92 days following filing of the Notice of Availability of the Draft EIS with the EPA. The purpose of public review was to receive comments from interested parties on the Draft EIS’s completeness and adequacy in disclosing the environmental effects of the alternatives under consideration, and input into Reclamation’s determination of a preferred alternative. Following the close of the public review period, the Final EIS was prepared that includes comments received on the Draft EIS and Reclamation’s responses to those comments.

Several hundred comments were received from Federal, State and local agencies, private organizations and businesses, and individuals. Many concerns were related to surface

water issues and the effects of contamination of the ocean and marine life. Public comments also addressed concerns about the specific alternatives, water quality, biological resources, regional economics and impacts, geologic and seismic hazards, groundwater resources, mitigation planning, compliance issues, accumulation of chemicals in the ground, and environmental justice issues.

Major areas of concern for each alternative expressed in Draft EIS comments are identified in the Final EIS and are summarized below.

In-Valley Alternatives

- Impacts to migratory waterfowl from the use of evaporation basins
- Economic impacts to local communities from land retirement
- Technical and economic feasibility of Se treatment

Ocean Disposal Alternative

- Impacts to ecology and tourism from drainage discharge into the Pacific Ocean
- Impacts to sensitive habitats from pipeline construction
- Impacts from pipeline failure

Delta Disposal Alternatives

- Impacts to drinking water supplies from salt discharge
- Impacts to birds and fish in the Delta from Se bioaccumulation
- Technical and economic feasibility of Se treatment

Comments Received on the Final EIS

A number of comments were received on the Final EIS from individuals and organizations in the Cayucos and San Luis Obispo, California area. These comments primarily suggested that Reclamation eliminate the Ocean Disposal Alternative and questioned the logic of the alternative.

Response: Reclamation has decided not to select the Ocean Disposal Alternative for implementation.

One comment that was received on the Final EIS voiced concern that the chosen alternative would continue to “cripple natural hydrologic and biologic functions of the San Francisco Estuary.”

Response: CALSIM modeling of the changes of salinity concentration entering the San Joaquin River and ultimately the San Francisco Bay indicates that implementation of any of the In-Valley Alternatives would result in a net decrease of salinity and an environmental improvement in the estuary.

Comments were received on the Final EIS regarding potential negative impacts of delivering water to drainage-impaired areas and potential negative impacts to the environment related to operating the evaporation ponds.

Response: Both of these issues were evaluated in the EIS and determined not to be a significant impact, based on implementation of the proposed design for the drainage service.

Comments received on the Final EIS suggested the use of alternative water treatment methods, increasing product water recovery from the reverse osmosis process, the use of product water for the creation of wildlife habitats, recycling of salts processed from the treatment system, eliminating the reuse areas, avoiding any land retirement, and maintaining maximum agricultural production in the Central Valley of California.

Response: As mentioned in the Final EIS (page ES-30) “all of the In-Valley Alternatives allow for flexibility in implementation including a phased approach for construction and mitigation and the ability to incorporate new technologies.”

Another technology-related comment received on the Final EIS focused on farming algae, which grows in the brine of reverse osmosis systems. The comment suggested that Reclamation consider conducting pilot tests for harvesting algae to produce bio-diesel. Another comment provided a reference to the work sited at www.permaculture.org regarding “Greening the Desert.”

Response: Emerging treatment technologies will be considered during the Project implementation phase and incorporated into the Project, as they are proven to be technologically feasible and cost effective.

Comments were received from the EPA on the Final EIS stating that “we understand that Reclamation has explicitly reserved its ability to select an alternative in its ROD different from the preferred alternative in the Final EIS.” “If Reclamation believes it will deviate substantially from its Final EIS preferred alternative in the ROD, we request a copy of the draft ROD and the opportunity to discuss the envisioned changes, as early as possible, so that we can collectively address our concerns.” EPA reiterated that they had raised significant objections with the Ocean and Delta Disposal Alternatives in the Draft EIS. EPA also recommended that the ROD (1) describe the proposed approach for ensuring that the Se treatment system will deliver water with Se concentrations below 10 ppb; and (2) further address air impact mitigation measures related to the implementation of land retirement, construction activities, and the operation of treatment systems.

Response: Reclamation has selected the In-Valley/Water Needs Land Retirement Alternative which is not substantially different (from an environmental perspective) than the In-Valley/Drainage-Impaired Land Retirement Alternative. The In-Valley/Water Needs Land Retirement Alternative retires 100,000 acres less farmland. Based on analysis documented in the EIS, this alternative would not substantially increase environmental impacts. The approach for ensuring operation of the biotreatment plants maintains the effluent at less than 10 ppb of Se will be to (1) follow the technology vendor’s operating instructions, which include weekly backwashing of bioreactors and monitoring and controlling nutrient addition; and (2) conduct periodic monitoring as described in Attachment 1. Additional information regarding the ability of the Se treatment to obtain targeted concentrations is included in Appendix B “Pilot Studies” of the Final EIS. Air impact mitigation measures are described in Attachment 1. Air impact mitigation measures for biotreatment will consist of collecting and filtering bioreactor off-gas to remove odor and hydrogen sulfide.

Comments on the Final EIS were received from DWR (San Joaquin District). These comments focused on the difficulties which may be encountered in managing the retirement of farmland and the local economic impact that would be caused by land retirement on the scale identified in the In-Valley/Drainage-Impaired Land Retirement Alternative (308,000 acres). These comments noted that Westlands is one of the largest and most productive farming areas in the world and that the In-Valley/Drainage-Impaired Land Retirement Alternative could result in a reduction of agricultural lands in Westlands by almost 40 percent, with the local economies losing as much as \$1.4 billion. The Department of the Navy also provided comments that the In-Valley/Drainage-Impaired Land Retirement Alternative would negatively impact military operations and training at Naval Air Station (NAS) Lemoore as well as cause economic impacts to NAS Lemoore and the local economy.

Additional comments regarding economic impacts of the land retirement proposed in the Project were received from various city and county officials in the Fresno, California area, as well as a number of California State legislators and senators. These comments encouraged Reclamation to select an alternative that would minimize land retirement and “preserve the Valley’s agricultural economy.” Comments were received from California State legislators expressing concerns that the NED Plan would significantly impact the agricultural economy and negatively impact one of the world’s most valuable and productive agricultural regions at a substantial taxpayer cost. Comments were received from members of the U.S. House of Representatives stating that they do not believe the NED Plan would adequately balance the needs of the Federal government, the farmers, the local communities and the environment. Additionally, they expressed their concerns regarding the implementation costs given budgetary constraints.

Response: Reclamation has selected the In-Valley/Water Needs Land Retirement Alternative for implementation. This alternative retires approximately 100,000 less acres of farmland than the In-Valley/Drainage-Impaired Land Retirement Alternative (the NED Plan).

Comments on the Final EIS also included concerns regarding the negative economic impact that the land retirement will have on the local communities. The comments stated that “farm workers and their families certainly will be displaced as a consequence of this governmental activity...” and that “Federal law requires that the impact of displacement must be mitigated in these circumstances.”

Response: Reclamation will consider means to reduce impacts to farm workers and families during the planning and construction phases of this Project and will comply with all applicable and required Federal employment laws.

Attachment 1
Mitigation, Monitoring, and Reporting Plan
San Luis Drainage Feature Reevaluation
In-Valley/Water Needs Land Retirement Alternative

I. Approach to Mitigation

This Mitigation, Monitoring, and Reporting Plan identifies project commitments for avoiding, minimizing, rectifying, or compensating for the adverse effects associated with constructing and operating the In-Valley/Water Needs Land Retirement Alternative. Potential environmental effects and mitigation measures are described in the San Luis Drainage Feature Re-evaluation Environmental Impact Statement (EIS), dated May 2006 (Final EIS) and the U.S. Fish and Wildlife Service Biological Opinion (Formal Consultation on the Proposed San Luis Drainage Feature Re-evaluation; California least tern, giant garter snake, and San Joaquin kit fox; Fresno, Kings, and Merced Counties, California, dated March 2006). The mitigation measures were developed with input from the San Luis Drainage Feature Re-evaluation (SLDFR) Mitigation Work Group. This group included representatives from the U.S. Fish and Wildlife Service, California Department of Fish and Game (CDFG), the Central Valley Regional Water Quality Control Board (CVRWQCB), and the Bureau of Reclamation (Reclamation).

These mitigation measures were designed to be fully enforceable through project design, permit conditions, agreements, or other measures. As the lead agency, Reclamation will be responsible for ensuring that implementation of selected measures occurs in accordance with an approved mitigation program or plan, including monitoring of the effectiveness of the approved plan, although other agencies may be involved in actual implementation or monitoring activities.

An adaptive management approach for mitigation and monitoring of the In-Valley/Water Needs Land Retirement Alternative will be implemented in cooperation with the Mitigation Work Group and permitting agencies. Although the best available information has been used to determine the likelihood and magnitude of effects and to identify mitigation measures, some uncertainties continue to exist in the predictions that have been made. Use of an adaptive management approach in conjunction with targeted monitoring will allow for adjustments to be made to minimize adverse effects and to provide adequate mitigation when effects occur. Adaptive management procedures will differ depending on the mitigation and monitoring component, but in general follow these steps:

- Identify assumptions made in prediction of effects.
- Determine initial mitigation plans based on prediction of effects.
- Determine contingency measures and triggers for implementation.
- Identify areas of highest uncertainty and design monitoring plan accordingly.
- Conduct baseline monitoring.
- Conduct first phase of mitigation.

- Implement first phase of monitoring to evaluate adequacy of mitigation and test assumptions.
- Analyze data and adjust the mitigation and monitoring plan as appropriate, implementing contingency measures or modifying the mitigation approach as necessary.
- Repeat the process.

Mitigation measures have been developed for all identified significant adverse effects. Mitigation measures have been incorporated into the project design, where feasible, or are to be conducted concurrent with and/or subsequent to project construction.

II. Affected Resources

The EIS process initially identified resources expected to be impacted by the various Action Alternatives, including effects to biological resources (terrestrial, aquatic and wetland, Federally-listed special-status species, State listed special-status species), ground stability (geology), air resources, land and soil resources, recreation resources, and cultural resources. The Final EIS determined that implementing the SLDFR project would result in some unavoidable impacts, but that they were all mitigable impacts.

Formal Section 7 Endangered Species Act (ESA) consultation with the U.S. Fish and Wildlife Service determined that possible impacts to Federal-listed threatened and endangered species (following appropriate minimization measures) would be limited to the San Joaquin kit fox (associated with the construction and operation of reuse facilities), and the California least tern (associated with the operation of evaporation ponds) and the giant garter snake (associated with the construction of conveyance and other facilities; see U.S. Fish and Wildlife Service Biological Opinion and Incidental Take Statement, Appendix M of the final EIS).

The Fish and Wildlife Coordination Act consultation with the U.S. Fish and Wildlife Service, and the risk assessment conducted within the SLDFR Mitigation Work Group additionally identified potential impacts upon reproduction and survival of migratory birds—including waterfowl and shorebirds—associated with the operation of evaporation ponds with elevated concentrations of selenium (Se) in the influent water (following reuse and treatment).

III. Minimization, Avoidance, and Mitigation Plans

Minimization, avoidance and mitigation measures will be used to reduce impacts to affected resources. These measures are described below.

A. General Avoidance and Minimization Measures

The following general avoidance and minimization measures either have been applied through the planning process or will be applied through the facilities construction and operation process.

Avoidance and Minimization of Wildlife Exposure through Land Retirement

Removing drainage-impaired areas from irrigated agriculture serves directly to reduce the volume of drainwater that must be collected, treated, and disposed in evaporation ponds. This strategy thereby reduces the overall acreage of evaporation ponds needed for drainwater disposal, and therefore reduces the risk of these facilities to exposed wildlife. This strategy represents an effective means to avoid negative impacts associated with drainwater conveyance, treatment, and disposal. In addition to this avoidance measure, certain minimization measures are planned for the operation of the reuse areas and evaporation ponds.

Avoidance and Minimization of Wildlife Exposure through Water Treatment

The biotreatment plants will be designed and operated to reduce Se to a monthly average concentration of 10 µg/L (ppb) or less in the treated effluent. In addition, an oxidation process will be used to convert the form of Se in the effluent to predominately selenate prior to discharge into the evaporation basin system. Biotreatment that reduces selenate to this level of performance will minimize wildlife risk significantly.

Minimization Measures Common to All Affected Species

Avoidance and minimization measures will be implemented for the project facilities, as appropriate to eliminate or minimize exposure to environmental hazards. The needs of listed species will continue to be addressed on a broad basis through continuing programs such as the Central Valley Project Conservation Program and the Central Valley Project Improvement Act b(1) program as funding and authorizations allow.

Avoidance and Minimization of Impacts through Design and Siting Measures

Design features will be incorporated into the planning, sizing, or routing/siting of project facilities to minimize their adverse environmental effects (e.g., odor control for the bioreactors, installing tailwater collection systems at reuse areas, constructing evaporation basins with steep embankments, providing alternative habitat near evaporation basins to reduce Se-related impacts to migratory birds, and installing groundwater monitoring wells near each basin site).

Avoidance and Minimization of Impacts through Operation and Maintenance Measures

Measures will be incorporated into the standard operating procedures of each facility to minimize the long- and short-term biological effects that could result from facility operation (e.g., using portable pumps to facilitate more rapid draining/filling of evaporation pond cells, limiting furrow lengths at reuse facilities, developing “wildlife friendly” management plans for selected retired lands). Such measures would also include weed management prescriptions for retired lands.

Avoidance and Minimization of Impacts through Construction-related Measures

Actions will be incorporated into construction activities and construction contract specifications to eliminate or reduce potential impacts that could occur during construction. Actions may include impact avoidance strategies (e.g., construction

scheduling to avoid critical life stages of selected species, exclusion fencing, limiting disturbance zones); utilizing approved construction techniques and practices (e.g., excavations at stream crossings, stockpiling topsoil); construction monitoring activities (including utilization of on-site biologists at selected construction sites); and construction site restoration/revegetation (including post-construction monitoring).

B. Specific Avoidance and Minimization Measures

Specific avoidance and minimization measures include those that apply to facilities, as well as those designed to address specific impacts to Federally-listed threatened and endangered species. These appear herein in the context of the project facilities (e.g. evaporation ponds or reuse areas), as referenced in further detail in the EIS and in the context of species-specific effects contained in the Biological Opinion and Incidental Take Statement (Appendix M of the Final EIS) that resulted from the Section 7 ESA consultation with the U.S. Fish and Wildlife Service.

Minimization Measures Specific to Facilities

Avoidance and minimization measures as they apply to project features include the following measures.

(1) Conveyance Systems

Drainwater conveyance systems constructed under the In-Valley/Water Needs Land Retirement Alternative will be closed pipeline which will serve to eliminate access of fish and wildlife, including the Federally-threatened giant garter snake.

(2) Evaporation Ponds

The evaporation ponds will be managed to minimize environmental impacts and wildlife exposure to the maximum practical extent by incorporating specific project design features that will include:

- (a) The bottom of all evaporation basins will either be lined or be constructed using natural clay liners compacted from native soils to reduce overall permeability of the foundation soils.
- (b) Basins will be constructed with side slopes close to vertical, with ramps to allow wildlife to escape if able to enter.
- (c) Evaporation basins will consist of sequential evaporation cells that diminish in size as the drainage flows towards the terminal cell where final salt precipitation occurs.
- (d) Basins will be located where underlying groundwater is not potable and not considered to be a source of drinking water (i.e., TDS > 3,000 mg/L).
- (e) Basins will be located above the 100-year floodplain or would be constructed to prevent overtopping during 100-year flood events.

- (f) Basins will be located on existing retired lands where practical.
- (g) Basins will be located in areas with flat or gently sloping terrain (as close to level as possible).
- (h) Basins will not be located within native or natural habitat types used by endangered or protected species.
- (i) Most basins will be surrounded by reuse areas, which will act as a buffer zone to nearby commercial irrigated agriculture.
- (j) Monitoring wells will be established near each basin site and used to verify (and monitor) groundwater conditions before, during, and after evaporation basin installation.
- (k) Management techniques will be implemented to minimize adverse biological effects associated with wildlife exposure to Se, including maintaining basin depths above four feet, aquatic and terrestrial vegetation control to avoid nesting habitat, and hazing of waterfowl. During periods of drawdown, affected cells will be actively managed and monitored. Portable pumps will be utilized to minimize the presence of shallow water or mudflats in receding cells and the frequency of hazing in these transitional areas will be increased.
- (l) Basin operational design will include provisions to evacuate individual evaporation basin cells if inflow is not sufficient to maintain a four-foot minimum depth.
- (m) Se concentrations within basin waters will be below levels designated as hazardous waste and Se concentrations within precipitated salts and sediments will be maintained below levels designated as hazardous waste.
- (n) Site closure will entail in-place burial of precipitated salts, placement of low-permeability soil cap, grading to control runoff and ponding of precipitation, establishment of vegetation to minimize erosion, and long-term monitoring of selected biota and the underlying groundwater.
- (o) Experimentation with methods to minimize invertebrate populations in evaporation basins will be conducted and the results utilized in adaptive management.
- (p) Measures for the protection of wildlife will be implemented, such as intensive hazing and salinity management, to minimize potential for salt encrustation and salt toxicosis to wintering birds, particularly on cold nights.

(3) Reuse Areas

The reuse areas will be tile drained and effectively managed to prevent the ponding of water except for very short durations. Other minimization measures for the reuse areas specifically associated with Federally-listed threatened and endangered species are described below.

Minimization Measures for Federally-listed Threatened and Endangered Species

Avoidance and minimization measures as they apply to species-specific effects include the following conservation measures identified in the Biological Opinion.

(1) Giant Garter Snake

(a) Guidelines identified in the U.S. Fish and Wildlife Service's *Standard Avoidance and Minimization Measures during Construction Activities in Giant Garter Snake (*Thamnophis gigas*) Habitat* will be followed when working within 200 feet of giant garter snake habitat.

(2) San Joaquin Kit Fox

(a) Guidelines identified in the U.S. Fish and Wildlife Service's *Standardized Recommendations for Protection of the San Joaquin Kit Fox* will be followed to reduce impacts to the San Joaquin kit fox. These standardized recommended measures will be implemented prior to or during ground disturbance, including completion of pre-construction surveys to identify potential kit fox activity, and implementation of approved conservation and avoidance measures.

(b) Most construction activity will occur during daylight hours to reduce impacts to the San Joaquin kit fox. No nighttime construction will be scheduled in the Northerly Area. However, if nighttime construction becomes necessary in the Northerly Area, the U.S. Fish and Wildlife Service will be consulted for guidance on appropriate protective measures to ensure the safety of kit fox engaged in nocturnal activities.

(c) The U.S. Fish and Wildlife Service, CDFG, Endangered Species Recovery Program (ESRP), and other knowledgeable parties will be contacted to help identify plants and management strategies that both maximize the function of the reuse areas for the drainage program (e.g., to evapotranspire large volumes of applied drainwater) while minimizing the risk of Se bioaccumulation to the kit fox. Reuse sites will be designed to limit crop types that support abundant small mammal prey populations. Vegetation types that kit fox prefer to avoid (e.g., tall, robust species that form dense ground cover), produce minimal seed, and/or are not known to bioaccumulate Se, will be planted.

(d) An Adaptive Operation and Monitoring Plan will be developed, in cooperation with the U.S. Fish and Wildlife Service, for the reuse and treatment facilities that will include monitoring to determine the level of use by San Joaquin kit fox. The San Joaquin kit fox monitoring will utilize a tiered system in which monitoring increases and additional contingency measures are implemented as needed based

on thresholds to be established in the Plan. The focus of monitoring for San Joaquin kit fox will be the reuse areas.

(e) Priority will be given to land retirement in areas needed for listed species recovery, particularly by San Joaquin kit fox, when retirement of those lands has first been determined to meet the needs of the SLDFR.

(f) Reclamation will seek to implement land retirement in accordance with the ESRP qualifying criteria listed on page 307 of Appendix F of the *Recovery Plan for Upland Species of the San Joaquin Valley* (U.S. Fish and Wildlife Service, 1998)..

(g) Reclamation will assist the U.S. Fish and Wildlife Service to develop and implement economic or other incentives for conservation and recovery on non-Federally owned lands retired as part of the SLDFR.

3. California Least Tern

(a) Reclamation and the water districts will work with the local mosquito abatement districts to minimize the use of *Gambusia* in the evaporation basins.

(b) The terminal cells of the evaporation basins will be capped quickly, when the cells are dry, to discourage nesting. Capping will be done in compliance with Regional Water Quality Control Board standards.

(c) An Adaptive Operation and Monitoring Plan will be developed, in cooperation with the U.S. Fish and Wildlife Service, for the evaporation ponds that will include monitoring to determine the level of use by California least tern. The California least tern monitoring will utilize a tiered system in which monitoring increases and additional contingency measures are implemented (as needed) based on thresholds to be established in the Plan. The focus of monitoring for California least tern will be the evaporation basins.

C. Mitigation

The following mitigation measures will be applied during project implementation and operations:

Mitigation for Construction-related Impacts

Some construction activities may result in adverse effects to the geologic environment through disturbance of soils and the potential for erosion during periods of stormwater runoff. Erosion of soils during construction will be minimized by hydroseeding of slopes to provide a vegetation cover, the use of straw bales, or the use of a Visquene plastic cover. Temporary drainage measures will also be used to prevent excessive slope runoff. Additionally, all routine construction Best Management Practices (BMPs) will be employed to reduce the generation of dust and properly manage any wastes used during construction activities.

(1) Air Quality

The following mitigation measures will be employed during construction activities to reduce the impact of emissions on air quality in the San Joaquin Valley:

- (a) Alternative fueled or catalyst equipped diesel construction equipment will be used.
- (b) Equipment idling time will be minimized (e.g., 10-minute maximum).
- (c) The hours for heavy-duty equipment and/or the amount of equipment in use will be minimized.
- (d) Electrically driven equivalents of fossil-fueled equipment will be used where practicable (provided they are not run via a portable generator set).
- (e) Construction will be limited during periods of high ambient pollutant concentrations, which may include ceasing of construction activity during the peak-hour of vehicular traffic on adjacent roadways.
- (f) Activities will be managed to limit emissions (e.g., rescheduling activities to reduce short-term effects).

(2) Lands

The following mitigation measures will be employed during construction activities to reduce impacts to lands in the San Joaquin Valley:

- (a) Bridges and canal siphons will be provided at regular intervals across canals to reduce severance effects on local land users, where practicable.
- (b) Pipelines in areas of cropland and high-quality rangelands will be backfilled in a manner that places the existing topsoil back on the surface of the backfill. Pipeline areas will also be reseeded with rangeland grasses and forbs common in the adjacent areas.
- (c) Stockpiles, new canal banks, and temporary construction zones will be periodically sprayed with water to prevent wind erosion and abate dust. Water erosion control measures may also be needed along some pipeline alignments and canals.

Mitigation for Recreational Resources

Mitigation for recreational resources will consist of constructing and operating the evaporation facilities in such a way that they will be unattractive to wildlife. It is possible that some of the waterfowl currently using existing wildlife refuges or duck clubs will use the mitigation wetlands, which may be located near existing refuges or wildlife management areas. During the siting and design of mitigation wetlands, the practicality of managing these sites for recreation, such as hunting or wildlife viewing, as current Refuges and Wildlife Management Areas in the San Joaquin Valley are managed, will be considered.

Mitigation for Cultural Resources

Prior to construction, a Class III (intensive) cultural resources survey will be undertaken for the Area of Potential Effect (APE), that has not been subject to prior survey coverage meeting current professional and Reclamation standards. The Class III survey will locate and record cultural resources that may be affected by project activities. Efforts will also be made to determine if any Native-American tribes have sites of religious or cultural significance within the APE. All cultural resources within the APE will be evaluated to determine if they are historic properties, sites eligible for inclusion in the National Register of Historic Places.

Although it is preferable to avoid historic properties whenever feasible, implementation of this project may result in adverse effects to historic properties through direct disturbance during construction activities. These potential effects will be mitigated, prior to construction, through development and implementation of a memorandum of agreement or its equivalent, developed in consultation with the State Historic Preservation Officer, possibly Native-American tribes, and interested members of the public, in accordance with Section 106 of the National Historic Preservation Act (NHPA).

Effects to significant cultural resources may be mitigated by a variety of methods, depending on the nature of the particular resource. Such methods may include data recovery, public interpretation, further documentation and recordation, or preservation by other means. These treatment measures would follow specific Historic Property Treatment Plans developed for the project, or would adhere to procedures outlined in a Memorandum of Agreement developed between Reclamation, the State History Preservation Office (SHPO), and other consulting parties in the Section 106 process.

Mitigation for Impacts to Migratory Birds (Reproductive and Survival)

Mitigation measures will be implemented to mitigate impacts to resident or migratory birds that are susceptible to Se toxicity posed by the project evaporation facilities. Mitigation planning for evaporation facilities was conducted through collaborative discussion and review by the Mitigation Work Group. Reclamation will continue to seek input and review of an interagency Mitigation Work Group through the final design, implementation, and monitoring of mitigation features of the In-Valley/Water Needs Land Retirement Alternative.

Mitigation protocol focuses on two mitigation habitat functions – alternative habitat (AH) intended to reduce or avoid toxicity exposure, and compensation habitat (CH) intended to compensate or offset unavoidable impacts. A total of up to 614 acres of AH, 268 acres of deep water CH, and 44 acres of shallow water CH habitat will be implemented as part of the In Valley/Water Needs Land Retirement Alternative (these may be rounded up to 80-acre increments for each mitigation habitat type making a total of 640 acres, 320 acres, and 80 acres, respectively). Calculation of alternative and compensation mitigation habitat acreage was based on *Compensation Habitat Protocol for Drainwater Evaporation Basins* (U.S. Fish and Wildlife Service, January 1995) and *Alternative Habitat Protocol for Drainwater Evaporation Basins* (U.S. Fish and Wildlife Service,

March 1995), modified as described in Appendix J1 of the Final EIS. The total AH and CH acreage calculations include a mitigation estimate plus a 100 percent adaptive management contingency allowance. The contingency allowance is intended to offset inherent uncertainties in the data and information currently available. In practice, the actual contingency site area implemented in subsequent adaptive stages depends on monitoring results from the initial mitigation sites.

(1) Alternative Habitat (AH)

Design elements incorporated into the evaporation basin, in particular constructing vertical side walls and maintaining depths greater than four feet, will result in little or no use by shorebirds or dabbling ducks at the basins. However, basin cells may be drawn down during some periods in the course of operation of the basins. A total of up to 614 acres of AH (307 acres estimated, 307 adaptive management contingency) will be implemented as part of the In-Valley/Water Needs Land Retirement Alternative. Functional objectives for AH center around attracting birds away from the hazard exposure by providing more attractive habitat in the nearby landscape and dilute the dietary toxin intake by providing a clean alternative food source. In the event pond depths at the evaporation basins fall or are expected to fall below two feet in basin cells, mitigation habitat in the form of AH will be flooded and operated to dilute Se exposure by dabbling ducks and shorebirds foraging in the exposed basins. The AH habitat site operations will be integral components of the evaporation facility operations and closely coordinated with monitoring plans.

By definition, the AH areas are located in proximity to evaporation basins and the total AH area for the In-Valley/Water Needs Land Retirement Alternative is divided between four drainage treatment sites in proportion to the evaporation basin surface areas. Construction of AH sites will coincide with construction of evaporation basins so as to be operational prior to or at the same time evaporation basins become operational.

(2) Compensation Habitat (CH)

Residual impacts for exposed birds (especially diving ducks, for which alternative habitat will not be constructed to avoid attracting nesting individuals to the evaporation ponds) will be compensated for by the construction of clean, managed CH remote from the evaporation basins. Compensation habitat includes shallow and deep water components. A total of up to 268 acres of deep water CH (134 estimated, 134 adaptive management contingency) and 44 acres of shallow water CH (22 estimated, 22 adaptive management contingency) will be implemented as part of the In-Valley/Water Needs Land Retirement Alternative. Functional objectives of CH center on replenishing or replacing unavoidable losses to bird populations due to project facilities. CH is by definition retroactive; to be done *after* unavoidable losses are known. To address the operational definition of CH, the concept of other habitat (OH) was considered by the Mitigation Work Group to denote areas potentially suitable as an allowance or banked habitat that could contribute toward defined CH mitigation objectives. In addition, the Mitigation Work Group considered that the concept of enhancement habitat (EH), i.e., enhancing existing undeveloped lands or restoring marginal depleted habitat, may provide a more practical and effective means to contribute toward CH mitigation objectives. During

implementation of the In-Valley/Water Needs Land Retirement Alternative, Reclamation (working with the Mitigation Work Group) may incorporate elements of OH and EH to meet CH objectives.

(3) Phased Mitigation Site Development

Initial construction will occur in the Northerly Area and mitigation development will coincide with project construction to ensure mitigation is in place when evaporation pond operations start. Monitoring investigations conducted during initial project operations would trigger adaptive management adjustments as appropriate. If monitoring results indicate the initial amount of mitigation is not sufficient, additional contingency mitigation habitat would be constructed in the Northerly Area, and additional mitigation incorporated into mitigation planning for future phases. On the other hand, if monitoring results indicate that effects were overestimated and more than enough mitigation was provided in the initial phase, adjustments will be made in planning for future phases to reduce the amount of mitigation.

Roughly one-half of the total mitigation area will be developed in the initial phase. However, specific characteristics of the three mitigation types Alternative Habitat-Shallow (AH-S), Compensation Habitat-Deep Water (CH-D), and Compensation Habitat-Shallow (CH-S) suggest an alternative development scheme may be more effective than a simple build-out based on establishing the initial one-half of total acres up-front, followed by up to an additional one-half total acres (adaptive allowance) for each mitigation habitat type. For example, AH would only be operated at irregular intervals to mitigate possible shorebird use during unavoidable evaporation basin drawdown events. In addition, the CH-D habitat type has the greatest uncertainty and need for data collection in the initial start-up phase. Specific details of mitigation habitat development will be determined in conjunction with the Mitigation Work Group during the final design phase.

(4) Water Supply to Support Mitigation Habitat

If the entire initial and adaptive management contingency mitigation site areas of all types are constructed and operated, the maximum annual water supply quantity required is estimated at 6,337 acre-feet (AF). Actual annual water needs to be provided are likely to be less than this maximum quantity for two reasons. First, the actual AH site area active at any time would depend on evaporation basin conditions. Second, this upper estimate assumes the CH-D site areas are operated at a constant inflow rate year-round, whereas desirable operation of CH would likely include seasonal drawdown for shallow habitat breeding and habitat maintenance purposes.

Terms and Conditions for Incidental Take for Federally-listed Threatened and Endangered Species

The following non-discretionary terms and conditions implementing Reasonable and Prudent measures to minimize the impact of take as specified in the U.S. Fish and Wildlife Section 7 ESA Biological Opinion and Incidental Take Statement (as amended) will be implemented:

(1) San Joaquin Kit Fox

(a) Reclamation shall incorporate into its Adaptive Operation and Monitoring Plan, in consultation with the Sacramento Fish and Wildlife Office (SFWO), specific requirements for the kit fox survey frequency, protocols, reporting, and adaptive management procedures for lands retired from irrigated agricultural production and either fallowed or dryland farmed. The purpose of these surveys and adaptive management procedures is to enable Reclamation to monitor conformance with the Incidental Take exemption provided by this Biological Opinion for San Joaquin kit fox for periodic discing on retired lands that are fallowed, or on lands that are dryland farmed, and to adaptively manage such practices as additional monitoring or survey information is collected over time, and to know at what point reinitiation of consultation would be required. Where lands are retired through recordation of a non-irrigation covenant but the title remains in private or District ownership, Reclamation and the SFWO shall also work with the land owners to secure access for the surveys agreed upon in the Adaptive Operation and Monitoring Plan.

(b) As part of the “strategic land retirement program” to maximize the benefits of retired lands to kit fox recovery within the primary goals of reducing contaminated drainage, Reclamation shall, in coordination with the U.S. Fish and Wildlife Service and willing landowners, develop long-term monitoring plans, contingency plans, and adaptive management plans to be incorporated into the operating plans for retired lands. The contingency plans shall identify measures that shall be implemented if kit fox survey results indicate biannual discing is not sufficient to deter kit fox den creation.

(c) Reclamation shall provide the U.S. Fish and Wildlife Service with copies of all surveys and monitoring results in a timely fashion (i.e., within 30 days for monthly surveys and monitoring results, and 45 days for quarterly surveys), so as to facilitate prompt analyses and decisions regarding land management.

(d) When planning and siting the retired lands that are to be used for grazing, Reclamation shall give priority to lands identified by the ESRP and the U.S. Fish and Wildlife Service that would maximize their utility for kit fox recovery when such lands also meet Project goals to reduce contaminated drainage.

(e) Reclamation shall complete preliminary site studies during feasibility and final design project planning stages to ensure that siting of SLDFR reuse areas are abutted on each side by land types (e.g., existing irrigated cropland or dryland

farmed land) that would tend to deter San Joaquin kit fox from traversing into the reuse areas. These surrounding land areas will attempt to provide a minimum barrier of 1.5 km between the reuse areas and any retired land being fallowed or grazed in order to deter kit fox crossing into a reuse area. In the event a 1.5 km barrier cannot be achieved, SLDFR reuse areas will be sited in such a manner that retired lands around the reuse area that will be fallowed or grazed do not provide an uninterrupted connective corridor through which kit foxes would likely travel from other potentially occupied habitat (e.g., natural areas outside the Project area).

(f) Reclamation shall, in consultation with the U.S. Fish and Wildlife Service, develop long-term monitoring plans, contingency plans, and adaptive management plans to be incorporated into the operating plans for reuse areas including:

(1) Reclamation shall work with the U.S. Fish and Wildlife Service and the CDFG to develop vegetation management plans for reuse areas that will reduce their attractiveness for the kit fox.

(2) Reclamation shall work with the U.S. Fish and Wildlife Service and the CDFG to develop both a kit fox survey plan and a tiered food chain monitoring plan for the reuse areas. These plans shall monitor the use of the areas by kit fox, as well as the Se levels in small mammal prey species and the vegetation they consume.

(3) Reclamation shall develop, in consultation with the U.S. Fish and Wildlife Service and the CDFG, and implement as needed, a contingency plan to reduce drainwater contaminant exposure if monitoring data indicate that San Joaquin kit foxes are being exposed to elevated Se levels in their prey from these areas. Examples of contingency measures may include small mammal trapping and removal, harvesting the standing reuse area crop, or installation of an exclusionary predator proof fence around the perimeter of the reuse area. The contingency plan shall be included in Project budget estimates.

(2) California Least Tern

(a) An interagency team with representatives from Reclamation, the U.S. Fish and Wildlife Service, local water districts, and mosquito abatement districts will be formed. The purpose of this team will be to develop a mosquito control plan for the Project's evaporation basins which will serve to minimize or eliminate the introduction of mosquito-predator fish (e.g., *Gambusia affinis*) into any evaporation ponds, or to eliminate the potential for least tern exposure to introduced fish populations. The goal of a joint mosquito control plan is to remove the potential for a piscivorous bird prey base that would likely develop highly elevated levels of Se from the evaporation pond water.

(b) Bird surveys by a biologist determined to be qualified by the U.S. Fish and Wildlife Service's SFWO will be conducted on and around each evaporation basin to determine the presence or absence of California least terns. Surveys shall be conducted by a qualified avian biologist or ecologist, and will be initially conducted on a bi-weekly basis from approximately one month prior to the typical arrival time for reproductive adults until the end of typical least tern chick fledging period. After the fledging period, surveys shall be conducted on a weekly basis for one month in order to observe any terns that may be attempting a second nest. Any documented least tern sighting shall trigger an increased monitoring protocol, with parameters dependent on the when the sighting occurred.

(1). If least terns are sighted outside of the typical breeding period (courtship, nesting, fledging), evaporation basins shall be surveyed daily, for a minimum of one hour of intense scanning (binoculars, spotting scopes) during optimal viewing daylight hours. The purpose of these surveys is to determine if terns are foraging from the evaporation ponds. If it is determined that terns are not feeding from the evaporation ponds, every effort shall be made to ascertain the likely feeding location or general direction via observations of flight lines. Monitoring of this nature will continue until least terns are not observed for three consecutive days, at which time the regular bi-weekly schedule may resume.

(2). If least terns are sighted during the typical breeding period, detailed censuses of the evaporation basins and surrounding lands for nesting terns shall be conducted in addition to the surveys described in 2.a. above. Any least tern nests found shall be monitored for reproductive success, following U.S. Fish and Wildlife Service-approved protocols. Any fail-to-hatch eggs will be collected, examined to determine egg status, and analyzed for total Se by a U.S. Fish and Wildlife Service-approved laboratory.

(3). If least terns are observed feeding from the evaporation ponds, observations shall continue until foraging stops. Foraging information shall be fully recorded, including such things as: number of feeding attempts per unit time; number of feeding attempts successful; prey items captured, identified to lowest possible taxon (e.g., fish vs. aquatic invertebrates).

(4). Once determined that least terns are foraging in the evaporation ponds, and the prey items have been identified, monitoring of the pond's biota shall commence. An appropriate biotic monitoring plan will be developed, which shall include, at a minimum, an adequate sample of the least tern prey items. Monitoring of additional food chain components may also be required. This monitoring effort will determine Se concentrations in the pond's biota in order to accurately assess the risk of

Se toxicity to least terns. Analysis of all biotic samples shall be conducted immediately on an emergency basis in order to most rapidly determine the extent and degree of risk, and implement any remediation response measures.

(c) Contingency plans and adaptive management plans will be developed that identify any and all feasible measures to minimize least tern risk of exposure to the evaporation pond's biota. These contingency and adaptive management plans will be incorporated into the operating plans for SLDFR evaporation ponds. These plans will require immediate coordination with the U.S. Fish and Wildlife Service and any other appropriate agency (*e.g.*, water districts, mosquito abatement districts) once evaporation pond foraging by least terns has been determined, and identify minimization measures to be implemented by Reclamation. Minimization measures may include: hazing of nesting least terns; enclosing the ponds in netting; removal of fish; water level control. This list of tactics is not meant to be considered comprehensive, and other viable options may be developed.

IV. Mitigation Monitoring Plans

Mitigation monitoring for the aforementioned mitigation plan elements will be implemented as part of the In-Valley/Water Needs Land Retirement Alternative. Although specific monitoring plan details will be developed as part of final design planning, the following general monitoring measures are proposed by project facility component. The Adaptive Operation and Monitoring Plan (as described below) will incorporate other contingency, monitoring, and adaptive management plans (as described in this ROD) to the extent practicable.

Reuse Facilities

An Adaptive Operation and Monitoring Plan will be developed, in cooperation with the U.S. Fish and Wildlife Service, for the reuse and treatment facilities that will include monitoring to determine the level of use by San Joaquin kit fox. The San Joaquin kit fox monitoring will utilize a tiered system in which monitoring increases and additional contingency measures are implemented as needed based on thresholds to be established in the Plan.

The U.S. Fish and Wildlife Service will be provided with copies of all surveys and monitoring results in a timely fashion, so as to facilitate prompt analyses and decisions regarding land management.

In consultation with the U.S. Fish and Wildlife Service, long-term monitoring plans, contingency plans, and adaptive management plans will be developed and incorporated into the operating plans for reuse areas. Development of these plans shall include:

(1) Coordination with the U.S. Fish and Wildlife Service and the CDFG and development of vegetation management plans for reuse areas that will reduce their attractiveness for the San Joaquin kit fox.

(2) Coordination with the U.S. Fish and Wildlife Service and the CDFG and development of both a San Joaquin kit fox survey plan and a tiered food chain monitoring plan for these reuse areas. These plans shall monitor the use of the areas by San Joaquin kit fox, as well as the Se levels in small mammal prey species and the vegetation they consume

Treatment Facilities and Evaporation Ponds

An Adaptive Operation and Monitoring Plan will be developed, in cooperation with the U.S. Fish and Wildlife Service, for the reuse and treatment facilities that will include monitoring to determine the level of use by the California least tern. The California least tern monitoring will utilize a tiered system in which monitoring increases and additional contingency measures are implemented as needed based on thresholds to be established in the Plan.

Mitigation for the treatment facilities and evaporation ponds will proceed in two phases. Starting with the drainage service construction, initial phase mitigation habitat site area will be established and intensive monitoring evaluation studies conducted during three of the first five to seven years of project operations. Data and information obtained during this initial phase monitoring will be used to adjust the second phase mitigation. Once the second phase adaptive or contingency mitigation is established, routine monitoring will continue at the initial and second phase mitigation sites and at the evaporation ponds through the remaining duration of the 50 year total project design life.

Specialized site evaluation studies will be used to address uncertainty factors in the mitigation analysis area estimates and to provide information for use in determining the additional habitat area established under the second phase adaptive allowance.

Monitoring will be conducted routinely at the evaporation basins and mitigation sites through all project development and operation phases. Specific monitoring plan details will be determined during final design. Specific Se toxicity monitoring will be required to meet permit provisions established by the CVRWQCB for discharge into evaporation facilities. In addition, the ongoing permit compliance monitoring data will also support the initial site studies for use in refining the mitigation analysis and adaptive implementation measures. Details for the sampling and analysis requirements will be developed in coordination with the CVRWQCB and the U.S. Fish and Wildlife Service.

V. Reporting and Enforcement Requirements

Injured San Joaquin kit fox, giant garter snake, or California least tern must be cared for by a licensed veterinarian or other qualified person; dead individuals of any of these three listed species will be preserved according to standard museum techniques and held in a

secure location. The U.S. Fish and Wildlife Service and the CDFG must be notified within one (1) working day of the discovery of death or injury to a San Joaquin kit fox, giant garter snake, or California least tern that occurs due to project-related activities or if observed at the project site. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the U.S. Fish and Wildlife Service, and any other pertinent information.

Reclamation will work with the CVRWQCB during the Waste Discharge Requirements permitting process to develop the specific reporting requirements for mitigation monitoring data collected during project implementation. The CVRWQCB is the California State agency entrusted with enforcing regulations associated with the discharge of drainwater into the evaporation ponds.

VI. Conservation Efforts

Reclamation will pro-actively work towards the conservation of the San Joaquin kit fox, giant garter snake, least tern, and other listed species within the context of the SLDFR. To the maximum extent feasible using applicable authority, Reclamation will use the SLDFR program to further the purposes of the ESA. Program activities that will be considered include the Conservation Recommendations described in the Biological Opinion.