APPENDIX A

Draft Friant-Kern Canal Capacity Restoration Feasibility Report

The Draft Friant-Kern Canal Capacity Restoration Feasibility Report is available online at:

http://www.restoresjr.net/activities/FeasibilityStudies/FKCCapRestDraftFeasibilityReport20110602.pdf

If you would like a hard copy, please contact Ms. Margaret Gidding at mgidding@usbr.gov or at (916)978-5461.

APPENDIX B

USFWS Species Database Search

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 110413113759

Database Last Updated: April 29, 2010

Quad Lists

OILDALE (240A)

Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Birds

Empidonax traillii extimus
southwestern willow flycatcher (E)

Mammals

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Monolopia congdonii (=Lembertia congdonii)
San Joaquin woolly-threads (E)

Opuntia treleasei
Bakersfield cactus (E)

ROSEDALE (240B)

Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys ingens
giant kangaroo rat (E)

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Caulanthus californicus
California jewelflower (E)

Monolopia congdonii (=Lembertia congdonii)
San Joaquin woolly-threads (E)

MCFARLAND (263B)
Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

FAMOSO (263C)
Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys ingens
giant kangaroo rat (E)

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Monolopia congdonii (=Lembertia congdonii)
San Joaquin woolly-threads (E)

DUCOR (287A)
Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Pseudobahia peirsonii
San Joaquin adobe sunburst (T)

SAUSALITO SCHOOL (287B)
Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Caulanthus californicus
California jewelflower (E)

DELANO EAST (287C)
Listed Species

Invertebrates
Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish
Hypomesus transpacificus
delta smelt (T)

Amphibians
Rana draytonii
California red-legged frog (T)

Reptiles
Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals
Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants
Caulanthus californicus
California jewelflower (E)

LINDSAY (310A)
Listed Species

Invertebrates
Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish
Hypomesus transpacificus
delta smelt (T)

Amphibians
Ambystoma californiense
California tiger salamander, central population (T)

Rana draytonii
California red-legged frog (T)

Reptiles
Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Pseudobahia peirsonii
San Joaquin adobe sunburst (T)

PORTERVILLE (310D)
Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Clarkia springvillensis
Springville clarkia (T)

Pseudobahia peirsonii
San Joaquin adobe sunburst (T)

ROCKY HILL (333D)
Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Birds

Gymnogyps californianus
California condor (E)

Mammals

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Pseudobahia peirsonii
San Joaquin adobe sunburst (T)

Candidate Species

Amphibians

Rana muscosa
mountain yellow-legged frog (C)

STOKES MTN. (355C)

Listed Species

Invertebrates

Branchinecta conservatio
Conservancy fairy shrimp (E)

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Lepidurus packardi
vernal pool tadpole shrimp (E)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Ambystoma californiense

California tiger salamander, central population (T)

Rana draytonii

California red-legged frog (T)

Reptiles

Thamnophis gigas

giant garter snake (T)

Birds

Gymnogyps californianus

California condor (E)

Mammals

Dipodomys nitratoides nitratoides

Tipton kangaroo rat (E)

Vulpes macrotis mutica

San Joaquin kit fox (E)

Plants

Chamaesyce hooveri

Critical habitat, Hoover's spurge (X)

Orcuttia inaequalis

Critical habitat, San Joaquin Valley Orcutt grass (X)

Pseudobahia peirsonii

San Joaquin adobe sunburst (T)

Candidate Species

Amphibians

Rana muscosa

mountain yellow-legged frog (C)

ORANGE COVE NORTH (356A)

Listed Species

Invertebrates

Branchinecta lynchi

vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus

valley elderberry longhorn beetle (T)

Lepidurus packardi

vernal pool tadpole shrimp (E)

Fish

Hypomesus transpacificus

delta smelt (T)

Amphibians

Ambystoma californiense

California tiger salamander, central population (T)

Critical habitat, CA tiger salamander, central population (X)

Rana draytonii

California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Orcuttia inaequalis
San Joaquin Valley Orcutt grass (T)

Pseudobahia peirsonii
San Joaquin adobe sunburst (T)

WAHTOKE (356B)

Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys nitratoides exilis
Fresno kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Orcuttia inaequalis
San Joaquin Valley Orcutt grass (T)

Pseudobahia peirsonii
San Joaquin adobe sunburst (T)

ORANGE COVE SOUTH (356D)

Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Lepidurus packardi
vernal pool tadpole shrimp (E)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Orcuttia inaequalis
San Joaquin Valley Orcutt grass (T)

Pseudobahia peirsonii
San Joaquin adobe sunburst (T)

PIEDRA (377C)

Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Fish

Hypomesus transpacificus
delta smelt (T)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)

Rana draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Mammals

Dipodomys nitratoides exilis
Fresno kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Sidalcea keckii
Critical habitat, Keck's checker-mallow (X)
Keck's checker-mallow (=checkerbloom) (E)

County Lists

No county species lists requested.

Key:

(E) *Endangered* - Listed as being in danger of extinction.

(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.

(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.

Critical Habitat - Area essential to the conservation of a species.

(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.

(C) *Candidate* - Candidate to become a proposed species.

(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the

county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements;

cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be July 12, 2011.

APPENDIX C

Draft Fish and Wildlife Coordination Act Report on the Friant-Kern Canal Capacity Correction Project

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
SJRRP Friant-Kern Canal Capacity Restoration

MAY 5 2011

Memorandum

To: Regional Manager, Bureau of Reclamation, Mid-Pacific Region, Sacramento, California (Attn: Alicia Forsythe)

From: Acting Assistant Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Draft Fish and Wildlife Coordination Act Report for the U.S. Bureau of Reclamation's Friant-Kern Canal Capacity Restoration Project

In accordance with 48 Stat. 401, as amended; 16 U.S.C. 661 et seq., this document constitutes the U. S. Fish and Wildlife Service's (Service) Draft Fish and Wildlife Coordination Act (FWCA) report to the U. S. Bureau of Reclamation (Reclamation) for the Friant-Kern Canal Capacity Restoration Project (Project). The FWCA requires Federal agencies proposing water resource development projects or involved in issuance of related permits or licenses to consult with the Service and provide equal consideration to the conservation, rehabilitation, and enhancement of fish and wildlife resources with other project purposes. The findings of this report are based on information provided in the April 2011 Friant-Kern Canal Capacity Restoration Project Environmental Assessment (Reclamation 2011) and review of available scientific literature and site visit on April 6, 2011. Our report addresses the proposed Project-related beneficial and adverse effects on fish and wildlife resources and provides recommendations for Project implementation. Details of the project's effects on federally listed species, pursuant to section 7 of the Endangered Species Act of 1973, as amended, are being addressed separately.

Background

In 1942, the Bureau of Reclamation (Reclamation) constructed Friant Dam on the San Joaquin River as part of the Central Valley Project (CVP). The dam serves many purposes, including the diversion of water to service the CVP Friant Division long-term contractors (Friant Contractors). The Friant Contractors to the south of the San Joaquin River receive water via the Friant-Kern Canal (FKC). The FKC carries water 151.8 miles from Millerton Lake (above Friant Dam) to the Kern River in an earthen and concrete lined channel, to provide agricultural supply and supplemental water to Fresno, Tulare and Kern counties. The FKC was originally built to have a

maximum capacity of 5,000 cubic feet per second (cfs) in the upper reaches with a decrease to 2,000 cfs at its terminus near the Kern River. The maximum design capacity was increased to 5,300 cfs when Reclamation raised the height of the concrete lining from the headworks to the Kings River Siphon in the 1970s. In spite of this channel modification, the FKC has not fully met its designed capacity, resulting in restrictions, at times, on water deliveries to Friant Contractors. Reclamation states that several factors are the cause of the diminished channel capacity and include the following: original design limitations, increased canal roughness, ground subsidence, changes in water delivery patterns and telescoping flow design of the canal. Reclamation conducted hydraulic modeling on the channel and identified areas of the FKC requiring modification to restore it to the capacity as originally designed.

The Settlement reached on the lawsuit (*NRDC, et al., v. Kirk Rodgers, et al.*) challenging the renewal of long-term water service contracts between the United States and Friant Contractors includes the reduction or avoidance of adverse water supply impacts on all of the Friant Contractors that may result from Interim and Restoration flows provided for in the Settlement (Water Management Goal). In 2009, the San Joaquin River Restoration Settlement Act (Settlement Act) authorized the implementation of the Settlement. Reclamation proposes to restore the designed capacity of the FKC under the auspices of Section 10201(a)(1) of the Settlement Act which provides for the *"restoration of the capacity of the Friant-Kern and Madera Canal to such capacity as previously designed and constructed by the Bureau of Reclamation."*

Project Area

The project area encompasses all of the terrestrial and aquatic areas within the construction footprint of the proposed FKC modification, from milepost (MP) 29.14 to 88.22, and the Little Dry Creek Wasteway facility located at MP 5.44. The project area also includes inlet/outlet structures and check structures within the FKC, select bridges crossing the canal, and existing right-of-ways (managed by Reclamation and the Friant Water Authority), to be used for staging and hauling of construction materials and equipment. Structural components and related facilities of the proposed project occur within Fresno and Tulare counties (Figure 1).

PROJECT DESCRIPTION

No Action Alternative

Under the No Action Alternative, Reclamation would not restore the original designed capacity of the FKC, and it would continue to operate under its current capacity-restricted condition.

Proposed Action

The Proposed Action would consist of restoring 59.08 miles of the FKC to the original designed maximum capacity. The modifications required to implement the Proposed Action include: raising the existing concrete and earthen lining; raising the existing banks; modification of the check structures and inlet/outlet structures; modification or replacement of select bridges crossing the canal; and modification of Little Dry Creek Wasteway facility.

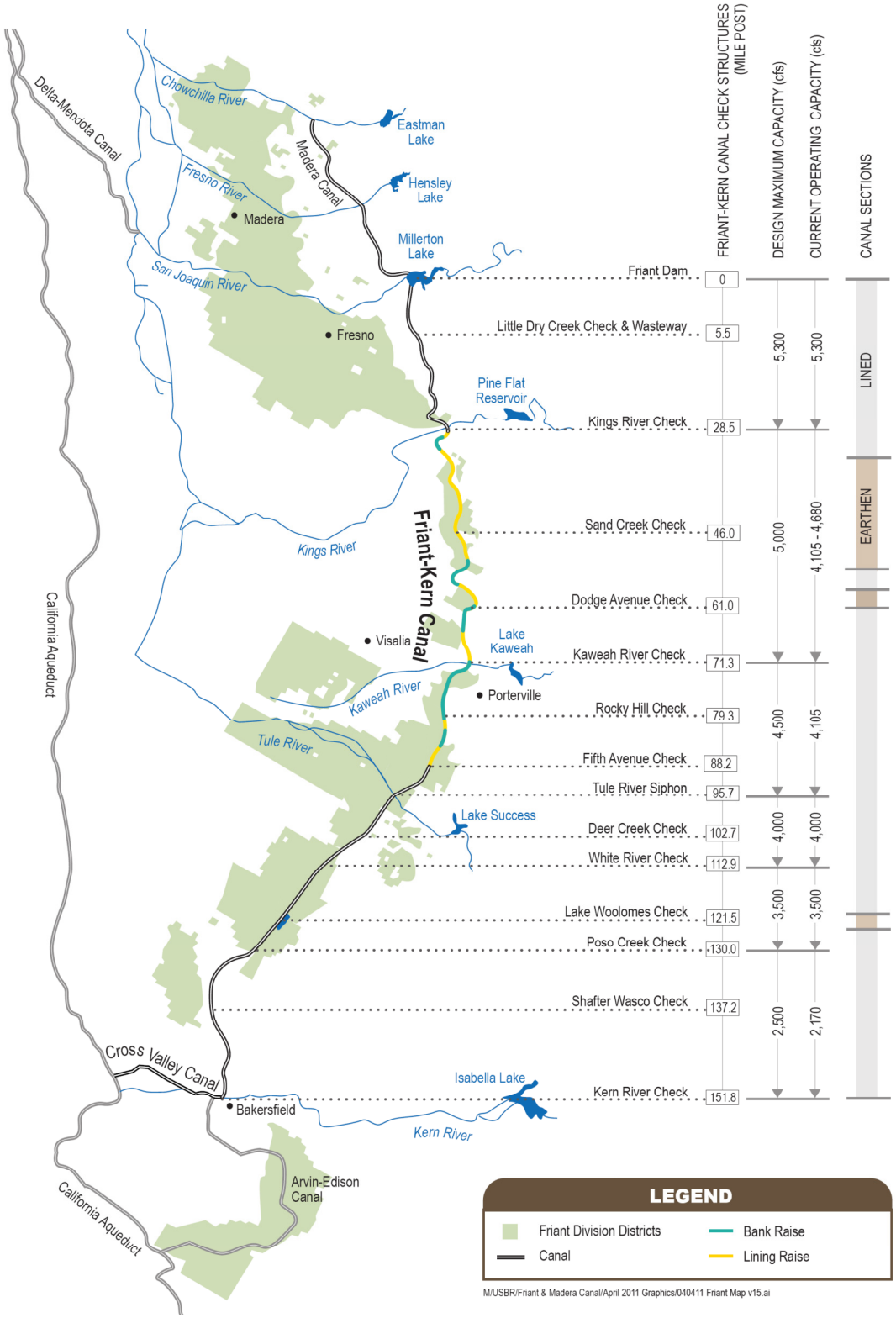

Figure 1. Location of the FKC with highlighted section depicting bank and lining raises.

The Proposed Action activities would require the excavation of about 400,000 cubic yards (cy) of soil and 17,000 cy of rock and the use of about 450,000 cy of backfill, 35,000 cy of concrete, 5,000 gallons elastomeric sealant, 85,000 cy of "beachbelting" riprap and 140,000 square yards of asphalt coating and aggregate base.

Lining Raises
The lining of the FKC channel would be raised to allow for the designed maximum channel capacity and an additional 1.15 feet of freeboard. The sections currently lined in rock and concrete would have additional concrete lining added, but the earthen sections would be re-lined with compacted soil rather than concrete. For earthen reaches, an area ranging from 3.5 to 8.0 feet wide and 1.0 to 4.0 feet deep would be excavated and then backfilled with existing spoil piles and compacted with heavy equipment. Concrete and rock lined reaches would also be excavated in a similar manner. Concrete lined sections would be formed and poured with concrete to the desired height, and rock lined sections would be drilled and excavated by hand until a surface suitable for adhering concrete to it is obtained.

Bank Raises
Bank raises in select reaches are required to increase the channel capacity in the FKC. Heavy equipment, including scrapers and loaders, would be used to increase the height of the bank by a minimum of 1.0 foot to a maximum of 2.0 feet. Additionally, a new road surface would be placed along the bank's crown. No sliver fill or levee footprint changes would be required.

Bridges
Forty bridges crossing the FKC require removal, modification or full replacement. The bridges vary in ownership (either State, County or privately owned) and are constructed of either timber or concrete. In some cases, utility lines are attached to the bridge crossings, and temporary disruptions in utility service (phone, water, gas) during construction may occur. The three existing timber bridges would be removed since they would likely be submerged by the elevated water surface levels, but only one bridge will be replaced. A crane would be used to remove the bridges and also to place precast concrete bridge components, although cast-in-place bridge construction may be used instead. The remaining 37 concrete bridges would require in-channel modifications, such as the addition of parapet walls, better anchoring or increased abutment weight, so the bridges maintain structural stability during high sustained flows.

Little Dry Creek Wasteway
The existing wasteway radial gates would be raised to accommodate the increased surface elevation in the FKC resulting from the enhanced channel capacity. Modifications would include: cleaning and preparation of the radial gates, construction of flashboard panels offsite, installation of the panels, and the painting the panels with galvanizing paint following installation.

Environmental Commitments

Reclamation has identified "environmental commitments" as both conservation measures and best management practices that would be implemented to ameliorate project impacts on fish, wildlife, and plant species, and include the following:

- Delineation of all waters of the United States, including wetlands, within 250 feet of areas subject to disturbance;
- Preconstruction surveys for nesting birds protected under the Migratory Bird Treaty Act (MBTA) and roosting bats;
- Compliance with the San Joaquin Valley Air Board's series of rules and regulations for ozone, including the control of PM10 emissions associated with construction activities,
- Submission of a Dust Control Plan;
- Implementation of measures to reduce noise levels from on-site construction equipment and the operation of equipment during specific daytime hours, and
- The staging and parking of construction related equipment in designated areas only.

EXISTING BIOLOGICAL RESOURCES

Annual Grassland Habitat

Annual grassland habitats are open grasslands composed predominantly of annual plant species (CDFG 2005). Perennial grass species once dominated native grasslands, but introduced annual species have largely displaced native perennial and annual grasses (CDFG 2005). Typical annual grass species are foxtail fescue, ripgut brome, red brome, wild oats, wild barley, soft chess, and Italian ryegrass; native perennial grasses include needle grasses, California onion grass, and Idaho fescue (CDFG 2005). It is currently unknown how many acres of annual grassland habitat would be impacted within the FKC project area.

Annual grassland habitat in the project study area may support several species of nesting birds. Western meadowlark, savannah sparrow, white-crowned sparrow, horned lark, grasshopper sparrow, short-eared owl, and ring-necked pheasant conceal their nests in the vegetation, and burrowing owls may use abandoned ground squirrel holes as nest sites. Some waterfowl, such as mallard and cinnamon teal, nest in grassy areas, particularly where this interfaces with open water areas. Grassland areas provide foraging habitat for migratory shorebirds and geese. The annual grassland habitat in the project study area may provide suitable nesting and foraging habitat for predatory birds such as, northern harrier, Swainson's hawk, white-tailed kite, red-tailed hawk, Cooper's hawk, American kestrel, and short-eared owl (USFWS 1995).

Reptiles typically found in annual grasslands include the western fence lizard, common garter snake, and western rattlesnake. Mammals found in this habitat include the black-tailed jackrabbit, California ground squirrel, western harvest mouse, California vole, badger, and coyote. The endangered San Joaquin kit fox may also be found in and adjacent to this habitat type (USFWS 2008).

Ruderal Herbaceous Habitat

Herbaceous cover may range from sparse to dense, with plant heights ranging up to 6 feet depending on soil and moisture conditions. Species composition varies with availability of moisture, disturbance, and maintenance work (mowing, burning, herbicide spraying). Common

plant species include natives and exotics such as mustard, wild radish, blackberry, fennel, poison hemlock, milk thistle, nut grass, and scouring rush (USFWS 1995). It is currently unknown how many acres of ruderal herbaceous habitat would be impacted within the FKC project area.

Ruderal herbaceous habitat provides food and cover for a variety of wildlife species. Some of these include the California vole, Botta's pocket gopher, western harvest mouse, house mouse, western fence lizard, common garter snake, lesser goldfinch, white-crowned sparrow, and red-winged blackbird. During site visits, a large number of red-winged blackbirds were observed using ruderal herbaceous habitat within the project site, and may include use as breeding habitat. Red-winged blackbirds are known to nest in herbaceous weeds near water, in addition to nesting in cattail marshes (Stokes 1979).

Seasonal Wetland Habitat

Seasonal wetland habitat has hydrologic conditions that are dominated by herbaceous vegetation that annually pond surface water or maintain saturated soils at the ground surface for enough of the year to support facultative or obligate wetland plant species (CALFED 2000). Seasonal wetland habitat provides food, cover, and breeding habitat for a variety of wildlife species. Some of these include shorebirds, wading birds, waterfowl, songbirds, raccoons, snakes, frogs, California voles, western harvest mice, aquatic invertebrates, and northern harriers. Freshwater seasonal wetland habitat is present the near the project study area and is found adjacent to the levees, but the acreage of this habitat type has not been provided yet by Reclamation. The Project area is dominated by man-made structures (the FKC and supporting levee banks), and it is unknown if the hydrological source for the wetlands is from storm run-off from upslope lands, run-off from service roads or seepage from the earthen lined sections of the FKC.

Barren/Riprap Habitat

Barren/riprap habitat includes disturbed areas such as roads, equipment storage areas, graveled levee tops, bare soil, and riprap. These areas provide extremely low habitat value and receive minimal use by native wildlife species. Barren/riprap habitat is found in the staging areas and access roads within the project area. It is currently unknown how many acres of barren/riprap habitat would be impacted within the FKC project area.

Habitat Associated with Project Structures

Bridges

There are 40 bridges that span the FKC between MP 29.14 and 88.22, and many support nesting colonies of cliff swallows. Cliff swallows nest on rocky cliffs, but they also take advantage of the availability of suitable habitat found in bridges, culverts, and buildings, which may serve as surrogates for cliffs (Brown and Brown 1995). Barn and Cliff swallows prefer vertical surfaces with overhangs for nest attachment, an open area for foraging, and a close source for mud to build nests. The bridges within the project area provide habitat suitable for those two species.

Friant-Kern Canal
The FKC was designed as a water conveyance system and not as habitat for aquatic biota, but, several fish species have been recorded in the canal. Kern brook lamprey were first discovered in the FKC in 1976 (Vladykov and Kott 1976), and both ammocoetes and adults were collected by California Department of Fish and Game from the siphons of the FKC in 1988 when rotenone was used to eradicate white bass from the system (Brown and Moyle 1993; Moyle 2002). The canal is not generally considered suitable habitat for the Kern brook lamprey because the high flows and trapezoidal channel provide little substrate (Vladykov and Kott 1976). Ammocoetes do enter the canal and find silty areas near the siphons to rear, but when mature, they are unable to spawn due to a lack of spawning gravels (Moyle 2002). Other fishes such as native minnows, and non-native warmwater sunfishes, catfishes and basses may occasionally be present in the FKC.

Special Status Species

California tiger salamander, Hoover's spurge, San Joaquin orcutt grass, vernal pool tadpole shrimp, vernal pool fairy shrimp and California condor may be present near the project footprint, as the designated critical habitat for these species occurs near the FKC project area. Elderberry shrubs, the host plant for the valley elderberry longhorn beetle, were seen near MP 32.9 (April 6, 2011 Environmental Site Visit), and may be within 100 feet of project area service roads. Consultation pursuant to section 7(a) of the Endangered Species Act will address potential impacts to these species in a separate document.

FUTURE CONDITIONS WITHOUT PROJECT

If the Project is not initiated, the FKC would continue to operate under its current capacity-restricted condition, resulting in limitations, at times, on water deliveries to Friant Contractors. Furthermore, without the Project, Reclamation could not meet the requirements of the Water Management Goal outlined in the Settlement and the Settlement Act, which could have legal ramifications for Reclamation.

Restrictions in water deliveries could have an effect on the local economy which relies heavily on agricultural production. Restrictions on water supplies may delay planting schedules or cause farmers to opt to fallow rather than plant agricultural lands during periods of unsure water availability. However, farmers could decide to rely on groundwater reserves instead of the FKC water supply, which may have indirect effects on fish and wildlife within the region.

Greater reliance on groundwater reserves, rather than FKC water, would increase groundwater pumping activities in the area. Increased pumping activity could lower the groundwater elevation and potentially cause further land subsidence, in an area well known for large subsidence events (Alley et al. 2002). Increased subsidence in the San Joaquin Valley could alter the stream course gradients within the region (Sun et al. 1999), thus causing the steepening and head-cutting (upstream erosion) of regional watercourses (Wilcox et al. 2001, NCDWQ 2005). The lower water table and steepened stream gradient can unnaturally dewater wetland areas and disconnect floodplains from perennial water sources (Yuill et al. 2009); resulting in habitat loss for migratory birds and wetland plants. Furthermore, the advancing upstream

erosion can degrade downstream water quality and aquatic habitat by increasing sediment loading (USGS 2000).

FUTURE CONDITIONS WITH PROJECT

The Project would restore the full designed capacity of the FKC, thus providing water deliveries to Friant Contractors without constraints imposed by existing canal restrictions and limitations, thereby meeting the requirements of the Settlement and the Settlement Act.

Terrestrial and Wildlife Resources
Since construction activities and the hauling of equipment and supplies will be limited to the access roads, the terrestrial habitat conditions are not expected to change significantly, but surface erosion and dust may occur with road activity, which may affect plants and grasses near the project area. Ruderal habitat is present near the staging areas and may be impacted, but this habitat type is common in high disturbance areas and can often re-establish after activities cease. However, wildlife may be present in these ruderal areas and near the spoil piles, such as birds, small mammals and reptiles.

Birds protected under the MBTA may be present in or near the project area, and include species such as the cliff swallow. Reclamation will conduct pre-construction surveys for birds protected under the MBTA if construction activities occur between February 15 and September 1. Reclamation has not addressed the potential loss of habitat for cliff swallows or other MBTA species nesting under FKC bridges, or habitat loss for roosting bats when water surface elevation increases with Project implementation.

Aquatic Resources
Seasonal wetland habitat is present near the Project study area, but Reclamation has not yet provided delineations or an evaluation of the FKC's hydrological connectivity to these wetlands. If it is found that no seepage from the FKC is occurring and thus, not contributing hydrologically to the wetlands, then there would be no change from the existing conditions, and lining and bank raises actions proposed under the Project would have no effect on this habitat type. However, if seepage is providing a hydrological connection, construction of the raises may reduce the capacity of the wetlands and may have effects on the species utilizing the wetlands.

The FKC and other aquatic habitats may be affected by the chemicals and compounds used during construction activities. The galvanizing paint proposed for use on the radial gates at the Little Dry Creek Wasteway facility could enter Little Dry Creek or the elastomer sealant used to construct the concrete lining could drain or drip into the FKC and affect the water quality.

With greater assurances of FKC water delivery, water users may be less likely to pump groundwater to supplement their irrigation needs. Decreases in groundwater pumping could slow subsidence rates in the area and decrease its effects on natural resources.

SERVICE MITIGATION POLICY

The recommendations provided herein for the protection of fish and wildlife resources are in accordance with the Service's Mitigation Policy as published in the Federal Register (46:15; January 23, 1981).

The Mitigation Policy provides Service personnel with guidance in making recommendations to protect or conserve fish and wildlife resources. The policy helps ensure consistent and effective Service recommendations, while allowing agencies and developers to anticipate Service recommendations and plan early for mitigation needs. The intent of the policy is to ensure protection and conservation of the most important and valuable fish and wildlife resources, while allowing reasonable and balanced use of the Nation's natural resources.

Under the Mitigation Policy, resources are assigned to one of four distinct Resource Categories, each having a mitigation planning goal which is consistent with the fish and wildlife values involved. The Resource Categories cover a range of habitat values from those considered to be unique and irreplaceable to those believed to be much more common and of relatively lesser value to fish and wildlife. The Mitigation Policy does not apply to threatened and endangered species, Service recommendations for completed Federal projects or projects permitted or licensed prior to enactment of Service authorities, or Service recommendations related to the enhancement of fish and wildlife resources.

In applying the Mitigation Policy during an impact assessment, the Service first identifies each specific habitat or cover-type that may be impacted by the project. Evaluation species which utilize each habitat or cover-type are then selected for Resource Category analysis. Selection of evaluation species can be based on several rationales, as follows: (1) species known to be sensitive to specific land- and water-use actions; (2) species that play a key role in nutrient cycling or energy flow; (3) species that utilize a common environmental resource; or (4) species that are associated with Important Resource Problems, such as anadromous fish and migratory birds, as designated by the Director or Regional Directors of the Fish and Wildlife Service. (Note: Evaluation species used for Resource Category determinations may or may not be the same evaluation species used in a Habitat Evaluation Procedures (HEP) application, if one is conducted). Based on the relative importance of each specific habitat to its selected evaluation species, and the habitat's relative abundance, the appropriate Resource Category and associated mitigation planning goal are determined.

Mitigation planning goals range from "no loss of existing habitat value" (i.e.: Resource Category 1) to "minimize loss of habitat value" (i.e.: Resource Category 4) (Table 1). The planning goal of Resource Category 2 is "no net loss of in-kind habitat value;" to achieve this goal, any unavoidable losses would need to be replaced in-kind. "In-kind replacement" means providing or managing substitute resources to replace the habitat value of the resources lost, where such substitute resources are physically and biologically the same or closely approximate those lost.

Table 1. Summary of Resource Categories, Designation Criteria and Mitigation Planning Goals under the Service Mitigation Policy

Resource Category	Designation Criteria	Mitigation Planning Goal
1	High value for evaluation species and unique and irreplaceable	No loss of existing habitat
2	High value for evaluation species and scarce or becoming scarce	No net loss of in-kind habitat value
3	High to medium value for evaluation species and abundant	No net loss of habitat value while minimizing loss of in-kind habitat value
4	Medium to low value for evaluation species	Minimize loss of habitat value

In addition to mitigation planning goals based on habitat values, Region 8 of the Service, which includes California, has a mitigation planning goal of no net loss of acreage and value for wetland habitat. This goal is applied in all impact analyses.

In recommending mitigation for adverse impacts to any of these habitats, the Service uses the same sequential mitigation steps recommended in the Council on Environmental Quality's regulations. These mitigation steps (in order of preference) are: avoidance, minimization, rectification, reduction or elimination of impacts over time, and compensation.

Four fish and/or wildlife habitats were identified in the FKC project study area which had potential for impacts from the Project. These habitats, and their corresponding evaluation species, designated Resource Categories and associated mitigation planning goals are discussed below, and summarized in Table 2.

Table 2. Resource Categories, Evaluation Species, and Mitigation Planning Goal for the Habitats Impacted by the Friant-Kern Canal Capacity Restoration Project

Cover-Type	Evaluation Species	Resource Category	Mitigation Goal
Annual grassland	Burrowing owl, Swainson's hawk, California vole	4	Minimize loss of habitat value.
Ruderal herbaceous	Red-winged blackbird	4	Minimize loss of habitat value.
Seasonal freshwater emergent wetland	Red-winged blackbird Killdeer, California vole	2	No net loss of in-kind habitat value.
Barren/Riprap *	None	4	Minimize loss of habitat value.

* No evaluation species were chosen because use by wildlife is minimal to none.

Annual Grassland Habitat

The evaluation species selected for annual grasslands in the project study area are the burrowing owl, Swainson's hawk, and the California vole. We chose the burrowing owl and Swainson's hawk as evaluation species because: (1) raptors, as predators, play a key role in community ecology of the study area; (2) they have important human non-consumptive benefits (e.g. bird watching); and (3) the Service's responsibilities for these species protection and management under the MBTA. We chose the California vole as an evaluation species because they are important prey species for a variety of wildlife species, including certain raptor species, predatory mammal species, and reptile species. Annual grasslands in the project study area have been designated Resource Category 4, based on the high degree of nonnative plant species they contain.

Ruderal Herbaceous Habitat

The evaluation species selected for ruderal herbaceous habitat in the project study area is the red-winged blackbird. We chose the red-winged blackbird as an evaluation species because: (1) they have important human non-consumptive benefits (e.g. bird watching); (2) and the Service's responsibilities for these species protection and management under the MBTA. Ruderal herbaceous habitat in the project study area has been designated Resource Category 4, based on the marginal habitat they provide to native species, and the high degree of nonnative plant species they contain.

Seasonal Wetland Habitat

The evaluation species selected for seasonal wetland habitat in the project study area are the red-winged blackbird, killdeer, and the California vole. We chose the red-winged blackbird and killdeer as evaluation species because: (1) they have important human non-consumptive benefits (e.g. bird watching); (2) and the Service's responsibilities for these species protection and management under the MBTA. We chose the California vole as an evaluation species because they are important prey species for a variety of wildlife species, including certain raptor and wading bird species, predatory mammal species, and reptile species. Due to the importance of emergent wetland habitat for migratory birds and for many other native wildlife species in the area, the Service has designated this habitat as Resource Category 2. Our associated mitigation planning goal for these areas is no net loss of in-kind habitat value.

Barren/Riprap Habitat

Evaluation species were not chosen because use by wildlife is so minimal. In view of the extremely low habitat value for most wildlife species provided by these areas in the project footprint, the Service finds that any highly disturbed habitats meeting the Barren/Riprap habitat definition that would be impacted by the project should have a mitigation planning goal of "minimize loss of habitat value" (Resource Category 4).

RECOMMENDATIONS

The proposed Friant-Kern Canal Capacity Restoration Project could have effects on fish and wildlife and their habitat. If Reclamation proceeds with the project as described, the Service recommends that Reclamation:

- Provide the acreages impacted for each Resource Category type listed in Table 2, so that compensatory mitigation recommendations can be developed;

- Minimize impacts to ruderal and annual grassland habitat that is temporarily disturbed during construction by reseeding with native grasses and forbs after the construction is complete;

- Implement an Erosion Control Plan and Stormwater Prevention Plan that minimizes erosion and sedimentation during construction by using erosion control devices, such as straw waddles;

- Survey the construction sites for ground nesting birds and if nests with eggs are found, it is recommended that either: (1) construction is delayed until nesting season is completed, or (2) eggs are removed from the nest and placed in a facility for incubation;

- Work towards making the proposed project carbon neutral. Consistent with the Intergovernmental Panel on Climate change (IPCC) (2007) adaptation strategies/mitigation recommendations, the Service recommends compensating for the proposed project's carbon footprint by purchasing carbon offsets. Alternatively, carbon offsets could be achieved through sequestering carbon (converting tilled agricultural fields near the project area to native grasslands);

- Implement a Hazardous Materials Control and Spill Prevention and Response Plan to avoid the release of hazardous materials to the environment (for chemicals such as the galvanizing paint for the radial gates);

- Implement the conservation measures listed in the Environmental Assessment for the Project, and;

- Maintain continuance of the collaborative approach to the planning and implementation of this Project with the Service.

If you have any questions regarding this report, please contact Stephanie Rickabaugh or Rebecca Lorig at (916) 414-6600.

REFERENCES

Alley, W.M., R.W. Healy, J.W. LaBaugh and T.E. Reilly. 2002. Flow and Storage in Groundwater Systems. Science 296:1985-1990.

Brown, C. R., and M. B. Brown. 1995. Cliff swallow (*Hirundo pyrrhonota*). In A. Poole and F. Gill, eds., The birds of North America, No. 149. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

Brown, L.R. and P.B. Moyle. 1993. Distribution, ecology, and status of the fishes of the San Joaquin River drainage, California. California Fish and Game 79: 96 -113.

CALFED Bay-Delta Program (CALFED). 2000. Multi-Species Conservation Strategy, Final Programmatic Environmental Impact Statement/Environmental Impact Report Technical Appendix. Contained in the 2000 Final Programmatic Environmental Impact Statement/Environmental Impact Report. Sacramento, California.

California Department of Fish and Game (CDFG). 2005. Annual Grassland (AGS). California Wildlife Habitat Relationships System. California Department of Fish and Game, California Interagency Wildlife Task Group. Accessed on April 14, 2011 from: http://www.dfg.ca.gov/biogeodata/cwhr/wildlife_habitats.asp#Herbaceous

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Core Writing Team, R.K. Pachauri and A. Reisinger (eds.). IPCC, Geneva, Switzerland, 104 pp. Accessed on March 23, 2010, from: http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

Moyle, P.B. 2002. Inland Fishes of California. University of California Press, Berkeley, CA.

North Carolina Division of Water Quality (NCDWQ). 2005. Identification Methods for the Origins of Intermittent and Perennial streams, Version 3.1. North Carolina Department of Environment and Natural Resources, Division of Water Quality. Raleigh, NC.

Stokes, Donald. 1979. Guide to Bird Behavior. Volume One. Little, Brown and Company, Boston, New York, and London.

Sun, H., D. Grandstaff and R. Shagam. 1999. Land subsidence due to groundwater withdrawal: potential damage of subsidence and sea level rise in southern New Jersey, USA. Environmental Geology 37:290-296.

U.S. Bureau of Reclamation (Reclamation). 2011. Friant Kern Canal Capacity Restoration Project Environmental Assessment. April 2011. U.S. Department of the Interior, U.S. Bureau of Reclamation, Sacramento, California.

U.S. Fish and Wildlife Service (USFWS). 1995. Planning Aid Report for the Western Delta Islands Reconnaissance Investigation. Sacramento, California.

USFWS. 2008. Threatened and Endangered Species Accounts. Sacramento Fish and Wildlife Office, Endangered Species Program, U.S. Fish and Wildlife Service. Accessed on April 14, 2011 from: http://www.fws.gov/sacramento/es/spp_info.htm

U.S. Geological Survey (USGS). 2000. Mississippi. U.S. Geological Survey Fact Sheet 025-99. Accessed on April 5, 2011, from: http://pubs.usgs.gov/fs/FS-025-99/

Vladykov, V.D. and E. Kott. 1976. A new nonparasitic species of lamprey of the genus *Entosphenus* Gill, 1862 (Petromyzonidae) from south central California. Bulletin of Southern California Academy of Sciences 75:60-67.

Wilcox, J. T. Benoit and L. Mink. 2001. Feather River Coordinated Resource Management Group. Evaluation of geomorphic restoration techniques applied to fluvial systems. December 2001. Accessed April 5, 2011, from: http://feather-river-crm.org/project-files/georest/cover.html

Yuill, B., D. Lavoie and D.J. Reed. 2009. Understanding Subsidence Processes in Coastal Louisiana. Journal of Coastal Research 54:23-36.