

RECLAMATION

Managing Water in the West

FINDING OF NO SIGNIFICANT IMPACT **SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT**

Conveyance of Refuge Water Supply Project East Sacramento Valley Study Area
Final Environmental Assessment

Gray Lodge Wildlife System Improvements

FONSI 12-02-NCAO

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Background

The Central Valley Project Improvement Act (CVPIA) [Public Law 102-575, October 1992, Section 3406(d)], mandated the Secretary of the Interior provide firm water supplies of suitable quality, in accordance with the Level 2 and Level 4 "Dependable Water Supplies Needs" table contained within the Report on Refuge Water Supply Investigations, Central Valley Hydrologic Basin, California, (March 1989), to maintain and improve wetlands and wildlife habitat areas (collectively referred to as refuges). One of the refuges identified in the CVPIA is the State of California's Gray Lodge Wildlife Area (Wildlife Area).

A portion of Level 2 water is delivered to the Wildlife Area through the Biggs-West Gridley Water District (Water District) at present. The Water District's conveyance system operates at full capacity throughout much of the year, and the system requires improvements to accommodate conveyance of the full Level 4 volume of water to the Wildlife Area, as identified in the CVPIA.

As a part of implementation of the CVPIA mandate for enhanced refuge and wildlife area water supplies, the 1997 *Conveyance of Refuge Water Supply Project East Sacramento Valley Study Area Final Environmental Assessment/Initial Study* (EA/IS), (Bureau of Reclamation and California Department of Fish and Game) evaluated a water delivery project utilizing the Water District's facilities to deliver water to the Wildlife Area. Of the 14 alternatives considered, the EA/IS selected Alternative GRA-9 (Use existing Biggs-West Gridley facilities with improvements) as the Preferred Alternative because it was most suitable of delivering the necessary water to the Wildlife Area in a cost-effective manner and had the least amount of environmental impact. Reclamation approved a Finding of No Significant Impact (FONSI) for this Alternative on August 10, 1998.

This Supplemental Environmental Assessment/Finding of No Significant Impact and Addendum to the Initial Study/Mitigated Negative Declaration (hereinafter "Supplemental EA/Addendum") to the EA/IS focuses on the proposed project of implementing the GRA-9 alternative with improvements. The GRA-9 alternative with facility improvements to the Water District's canals and laterals are intended to increase the capacity of the system during periods of peak delivery. The current Proposed Project includes specific actions in the main Upper Belding Canal and the laterals it feeds: including Belding, Schwind, Traynor, Rising River, and Cassady laterals to include 69 minor structural modifications (disturbing less than 0.5 acre of land each), and 25 major structural modifications (disturbing over 0.5 acres of land each). The purpose of this Supplemental EA/Addendum is to evaluate the potential environmental impacts associated with site-specific design details of the preferred alternative for consistency with the findings of the EA/IS.

Findings

In compliance with the National Environmental Policy Act (NEPA), a Final EA was prepared in December 1997, and was adopted by Reclamation with a Finding of No Significant Impact (FONSI), August 10, 1998. This Finding of No Significant

Impact/Supplemental EA reconfirms the validity of the adopted FONSI, and specifically finds:

1. The proposed project is not a major federal action that would significantly affect the quality of the human environment. Therefore, an environmental impact statement is not required to carry out the proposed action.
2. The Findings of the 1998 FONSI were reconfirmed in this Supplemental EA, and include:
 - (a) Impacts to existing agricultural land uses will be temporary.
 - (b) Potential effects of the proposed project on the giant garter snake, a federally listed endangered species, are consistent with the findings and conclusions of the Biological Opinion issued by the U.S. Fish and Wildlife Service for the project (December 1998, as appended 2009), and temporary and permanent habitat losses will be fully mitigated as a condition of project implementation. Mitigation will include the following.
 - Conduct pre-construction surveys for giant garter snake (GGS) between April 15 and June 1 by a qualified biologist, and
 - If a snake is observed during construction, operations in the immediate area will cease, the Service will be notified and measures consistent with the Service's Appendix D (USFWS 1999) will be implemented.
 - (c) Potential effects on other biological resources within the project area are less than significant with implementation of the following mitigation measures:
 - Conduct pre-construction surveys for raptors (including Swainson's hawk) prior to the peak March-through-August nesting period.
 - Monitor the site to assess mitigation success following project completion.
 - (d) Effects on hydrology or water quality are expected to be minimal because instream construction will be conducted to limit turbidity levels in conformance with an approved erosion and sedimentation control plan.
 - (e) There will be no effect on historic properties.
 - (f) The proposed project will not affect any Indian Trust Assets.
 - (g) The Proposed Action would not limit access to and ceremonial uses of Indian sacred sites on Federal lands by Indian religious practitioners, or adversely affect the physical integrity of such sacred sites. There would be no impacts to Indian sacred sites as a result of the Proposed Action.
 - (h) Project design features and mitigation measures have been identified and included as required conditions of approval to reduce all impacts to a less than significant level. A complete list of these measures is included in Section V of the attached Supplemental EA document.

**SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT/
FINDING OF NO NEW SIGNIFICANT IMPACT
and
ADDENDUM TO THE INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION**

**Conveyance of Refuge Water Supply Project
East Sacramento Valley Study Area Final
Environmental Assessment [Finding of No
Significant Impact]/ Initial Study [Mitigated
Negative Declaration]**

Gray Lodge Wildlife System Improvements

Lead Agencies

United States Department of the Interior, Bureau of Reclamation
California Department of Fish and Wildlife

October 2013

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List of Acronyms and Abbreviations

| | |
|---|----------------|
| acre-feet | af |
| Area of Potential Effect | APE |
| Biggs-West Gridley Water District | Water District |
| Biological Opinion | BO |
| California Department of Fish and Game | CDFG |
| California Department of Fish and Wildlife | CDFW |
| California Endangered Species Act | CESA |
| California Environmental Quality Act | CEQA |
| California Natural Diversity Database | CNDDDB |
| California Register of Historical Resources | CRHR |
| California Public Resources Code | PRC |
| California State Historic Preservation Office | SHPO |
| California Wildlife Habitat Relationship System | CWHRs |
| Central Valley Project | CVP |
| Central Valley Project Improvement Act | CVPIA |
| Code of Federal Regulations | CFR |
| Council on Environmental Quality | CEQ |
| Environmental Assessment | EA |
| Federal Endangered Species Act | FESA |
| Finding of No Significant Impact | FONSI |
| Geographical Information System | GIS |
| Giant Garter Snake | GGs |
| Initial Study | IS |
| Memorandum of Agreement | MOA |
| Migratory Bird Treaty Act | MBTA |
| Mitigated Negative Declaration | MND |
| Mitigation Measures | MM |
| National Environmental Policy Act | NEPA |
| Occupational Safety and Health Administration | OSHA |
| Project Design Features | PDF |
| Regional Water Quality Control Board | RWQCB |
| State Water Project | SWP |
| To Be Determined | TBD |
| Union Pacific Railroad | UPRR |
| United States | US |
| United States Army Corps of Engineers | ACOE |
| United States Department of the Interior, Bureau of Reclamation | Reclamation |
| United States Fish and Wildlife Service | Service |

**Supplemental Environmental Assessment/
Finding of No Significant Impact
and
Addendum to the Initial Study/Mitigated Negative Declaration

Conveyance of Refuge Water Supply Project
East Sacramento Valley Study Area
Gray Lodge Wildlife System Improvements**

I. Introduction and Background

Terminology

A National Environmental Policy Act (NEPA) supplement document is not comparable to a California Environmental Quality Act (CEQA) addendum document. This joint *Supplemental Environmental Assessment/ Finding of No New Significant Impact and Addendum to the Initial Study/Mitigated Negative Declaration for the Conveyance of Refuge Water Supply Project East Sacramento Valley Study Area Gray Lodge Wildlife System Improvements* document addresses requirements and criteria for both NEPA and CEQA processes. Furthermore, NEPA uses the term “proposed project” to describe the subject project, whereas CEQA uses the term “proposed action.” For the purpose of this document, both “Proposed Project” and “Proposed Action” will be referred to as the “Project.”

Introduction

In 1998, the Bureau of Reclamation (Reclamation), in cooperation with the U.S. Fish and Wildlife Service (Service), and the California Department of Fish and Wildlife² (CDFW) prepared an Environmental Assessment/ Initial Study (EA/IS) to evaluate water supply alternatives to meet optimal wildlife habitat conditions on Gray Lodge Wildlife Area (Wildlife Area) (DOI and CDFG 1998). This review was conducted pursuant to Section 3406 (d)(5) of the Central Valley Improvement Act (CVPIA, Act). Specifically, the EA/IS assessed potential environmental impacts regarding proposed construction and/or improvements to existing conveyance facilities for water supplies to Sutter National Wildlife Refuge and Gray Lodge Wildlife Area within the East Sacramento Valley area of the Central Valley. The EA/IS was adopted by the United States Department of the Interior, Bureau of Reclamation (Reclamation) with a Finding of No

² Effective January 1, 2013, the California Department of Fish and Game (DFG) became the California Department of Fish and Wildlife (DFW). In this report, references to the agency, even in the past will use DFW. However, reports prepared by the agency prior to the name change will be referenced as DFG.

Significant Impact (FONSI) (August 10, 1998), and certified by the California Department of Fish and Wildlife (CDFW) with a Negative Declaration (ND) (December 19, 1998). In this assessment, the preferred alternatives GRA-9 (use of existing Biggs-West Gridley Water District facilities with improvements) and GRA-14 (use of existing Butte Water District facilities with improvements) were identified as being equally capable of suitable and cost effective water delivery to the Wildlife Area.

Reclamation's Findings determined *"that implementation of the preferred alternatives would not have significant adverse impacts on the quality of the human environment. This determination was based on analysis of environmental impacts using the best available information, through review of the comments received on the draft EA, Endangered Species Act Section 7 consultation, coordination concerning Indian Trust Assets and environmental justice implications, and the environmental commitments listed in the final EA. The proposed project would provide delivery infrastructure to transport Level 4 water supplies to the Sutter National Wildlife Refuge and Gray Lodge Wildlife Area."*

Similarly, on the basis of the Initial Study review, and identified mitigation measures, the CDFW determined that "No substantial evidence exists that the project will have a negative effect on the environment" and that:

- a) The project will not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish and wildlife species, cause a fish and wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare and endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory;
- b) The project will not have the potential to achieve short-term goals to the disadvantage of long-term environmental goals;
- c) The project will not have effects that are individually limited, but cumulatively considerable;
- d) The project will not have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly.

Background

CVPIA [Public Law 102-575, October 1992, Section 3406(d)], mandated the Secretary of the Interior provide, either directly or through contractual agreements with other appropriate parties, firm water supplies of suitable quality, in accordance with the Level 2 and Level 4 "Dependable Water Supplies Needs" table contained within the *Report on Refuge Water Supply Investigations, Central Valley Hydrologic Basin, California* (March 1989 Report). The stated purpose of the Act is to "maintain and improve wetland habitat areas on units of the National Wildlife Refuge System in the Central Valley of California; on the Gray Lodge, Los Banos, Volta, North Grasslands, and Mendota state wildlife management areas; and on the Grasslands Resources Conservation District in

the Central Valley of California”, collectively referred to as refuges. The Secretary of the Interior directed Reclamation, in cooperation with the United States Department of the Interior, Fish and Wildlife Service (Service), to provide these water supplies to the refuge boundaries.

Level 2 water allocation represents the historical average annual amount of water received at each refuge (March 1989 Report), and is provided primarily from Central Valley Project (CVP) yield. Level 4 water allocation is defined as that quantity of water required for optimum habitat management. Incremental Level 4 water represents the difference between Level 2 and Level 4 allocations. Incremental Level 4 water supplies must be acquired pursuant to Section 3406(d)(2) of the Act.

Level 4 water allocation for the Gray Lodge Wildlife Area is 44,000 af. Level 2 water allocation is 35,400 af. Incremental Level 4 water allocation is 8,600 af.

The Gray Lodge Wildlife Area was established in 1931 and is operated and managed consistent with the Lea Act. Historically, pumped groundwater and drain water were used to maintain the original lands. As a result of the Wildlife Area’s expansion, through the acquisition of adjacent lands, portions of the Wildlife Area are located within the Biggs-West Gridley Water District (Water District). The Wildlife Area has been receiving surface water deliveries annually conveyed by the Water District since October 8, 1952. CDFW, through ownership of the Wildlife Area, is a member of the Water District. Currently, the Wildlife Area receives Level 2 water supplies from several sources consisting of the following:

- Primary and secondary CDFW water rights surface water conveyed by the Water District;
- CVP yield surface water conveyed by the Water District through a cooperative agreement with Reclamation. This water originates from California State Water Project (SWP) supplies in the Oroville Reservoir and is later exchanged for CVP supplies through the Coordinated Operating Agreement between Reclamation and SWP; and
- Groundwater pumped from wells located within the Wildlife Area.

The Water District’s existing facilities convey water from the Sutter Butte Canal, south of the Thermalito Afterbay of the SWP, throughout its service area. The Water District conveys surface water supplies to the Wildlife Area, but has insufficient capacity through its current facilities to convey the full volume of water supplies for optimum habitat development (temporal and/or quantitative) allocated under the CVPIA. Therefore, the Project consists of improvements to the Water District’s facilities for conveyance of the full Level 4 water supplies to the Wildlife Area.

Currently, the Water District conveys water supplies to members of the Water District, including the Wildlife Area, on a supply-available and capacity-available basis. Existing facilities were not designed to meet Wildlife Area optimum habitat management requirements simultaneously with existing agricultural demands. The Water District’s facilities must be dewatered for maintenance purposes during the non-irrigation season

and, therefore, do not have year-round delivery capability. Facilities must therefore be modified to meet the current and future management flows, including full Level 4 water supplies, to help meet optimum water supply level for the Wildlife Area habitat management goals and objectives while accommodating the Water District's operating and maintenance practices that may include dewatering during the non-irrigation season.

In 2003, the Water District and Reclamation entered into *Cooperative Agreement* No. 03-FC-20-2049 (Cooperative Agreement) in support of the CVPIA Refuge Water Supply Program. The Cooperative Agreement covers development of system improvements and long-term conveyance of water by the Water District to the Wildlife Area. Implementation of the *Cooperative Agreement* requires modification of the Water District's existing facilities to achieve project goals. The *Final Design Data Report for Conveyance of Refuge Water Supply to Gray Lodge Wildlife Area* (Design Data Report, 2009) identifies system improvements that would enable the Water District to deliver a firm, reliable water supply to the boundary of the Wildlife Area while maintaining deliveries to its service area.

Summary of Conclusions from 1997 EA/IS

The EA/IS evaluated the potential environmental impacts of implementing conveyance improvements required to convey water utilizing the Water District's system to the Wildlife Area. The EA/IS analyzed the Project with 14 alternatives relating to the Wildlife Area. Of the 14, four (4) were found to be feasible and were considered in detail. The EA/IS concluded:

"The GRA-9 [utilizing Biggs-West Gridley Water District's conveyance system] and GRA-14 [utilizing Butte Water District's (BWD) conveyance system] alternatives were determined to be equally ranked as recommended. GRA-9 was ranked slightly higher with regard to water quality, environmental issues and engineering. GRA-9 was determined to be the least costly but only by a small degree as compared to GRA-14. GRA-9 was considered the least reliable based on historic operations, while GRA-14 was ranked only slightly higher due to BWD being very interested to serve the area but needing to construct a number of new facilities. GRA-3 [constructing a new canal from Thermalito Afterbay] was ranked lowest due to high capital cost and implementation and environmental issues associated with a major permanent concrete lined canal. GRA-1 [constructing a new pipeline from Thermalito Afterbay] was determined to be the most expensive alternative, but was ranked high in terms of water reliability and water quality due to direct connection with Thermalito Afterbay."

On December 7, 1998, the Service issued a Programmatic *Biological Opinion on Conveyance of Refuge Water Supply Project, West and East Sacramento Valley, California* (BO). The Service's BO discussed the effects of the proposed project on the giant garter snake, in accordance with Section 7 of the Endangered Species Act of

1973, as amended. The BO addressed the effects of improvements to conveyance facilities that are necessary to deliver full Level 4 water quantities to the Wildlife Area boundary.

Prior to the BO, surveys of the Project area were conducted during the fall of 1995 and 1996 to determine whether the Project would affect any federally listed species or species proposed for listing. The Service's BO determined the following were not found in the area to be impacted by the structural modifications: Elderberry bushes; Vernal pool habitat; Palmate-bracted bird's beak habitat; and Sacramento splittail. The BO identified an 11-acre maximum of permanent loss of upland and aquatic giant garter snake habitat within the Water District adjacent to the canal system; however a field review in 2009 identified a potential disturbance of giant garter snake habitat twice that size (22 acres), which is likely to occur from canal widening and related Water District system improvements.

II. Purpose and Need

Purpose and Need for the Proposed Project

The purpose for the Project has not changed since the original 1997 EA/IS was prepared. The purpose is to fulfill certain obligations as specified in Section 3406(d) of the CVPIA to provide reliable water supplies for optimum habitat development on the Gray Lodge Wildlife Area. The need for the Project is to increase the Water District's system conveyance capacity to convey full Level 4 water supplies to the Wildlife Area.

Purpose of the Supplemental EA/Addendum

This Supplemental Environmental Assessment/Finding of No Significant Impact and Addendum to the Initial Study/Mitigated Negative Declaration (hereinafter "Supplemental EA/Addendum") focuses on one of the projects from the EA/IS, implementing the GRA-9 alternative with improvements. In the interim, Reclamation, CDFW, and the Biggs-West Gridley Water District have been working to define the facility improvements for the Water District's canals and laterals to provide sufficient capacity during periods of peak delivery to deliver the Level 4 water. The current Project includes specific improvements to the main Upper Belding Canal and the laterals it feeds. The purpose of this Supplemental EA/Addendum is to evaluate the potential environmental impacts associated with the site-specific design details now available for consistency with the findings of the EA/IS.

This Supplemental EA/Addendum has been prepared in accordance with requirements of the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.); Council on Environmental Quality regulations implementing NEPA (40 CFR parts 1500–1508); the California Environmental Quality Act (CEQA); the California Public Resources Code §§21000-21178; and in compliance with the State CEQA Guidelines (California Code of Regulations, Title 14 Chapter 3 §§15000-15387)

Reclamation is the NEPA lead agency, and CDFW is the CEQA lead agency. These agencies, together with the Water District, will consider the potential environmental impacts of the Project improvements to the water conveyance system as one element of determining whether to approve the Project. This Supplemental EA/Addendum is an informational document, intended to be used in the planning and decision-making process as provided in Section 15164 of the CEQA Guidelines, and within 40 CFR 1508.9, 43 CFR 46.300-325, and 516 DM 1.12.

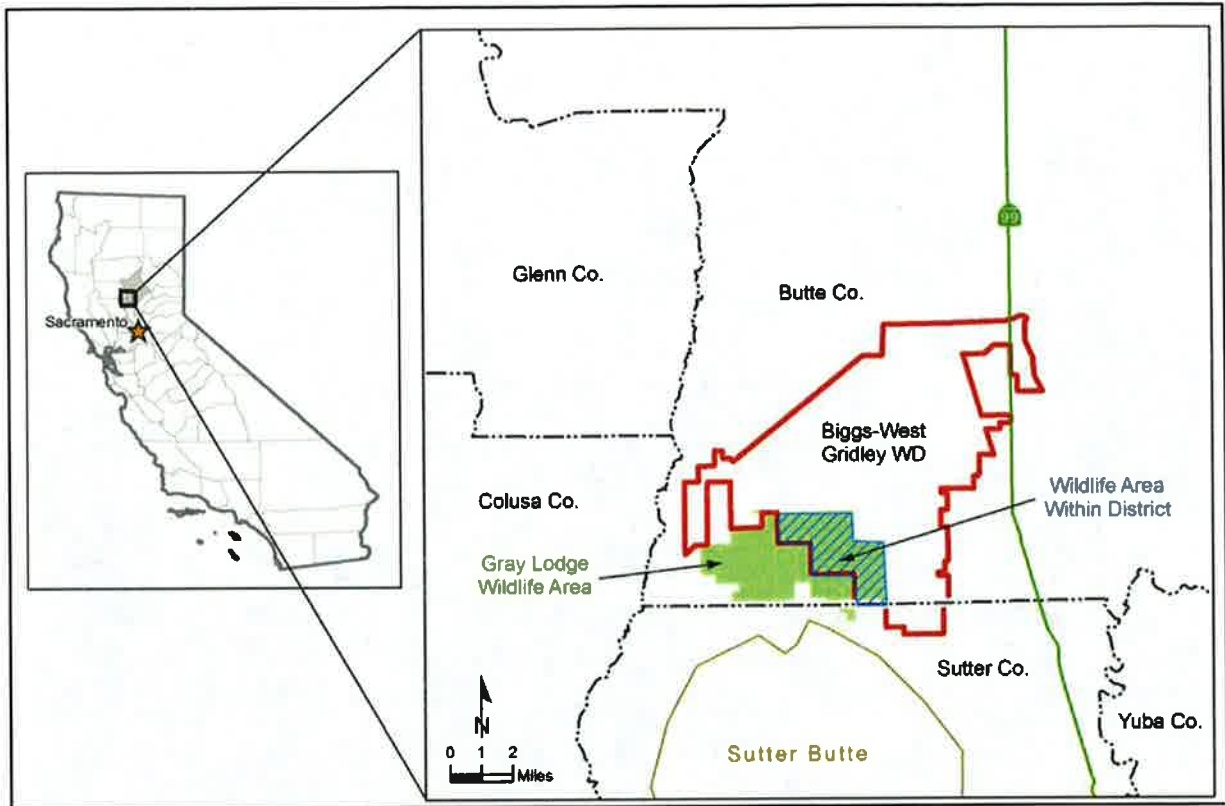
III. Proposed Project

Project Location

The Wildlife Area is located 65 miles north of Sacramento in the eastern Sacramento Valley (**Figure 1**). It is owned and managed by CDFW, and depends on the Water District to convey most of its water supply. Through an agreement with Reclamation, the Water District conveys CVP Level 2 water to the seasonal wetlands, irrigated pastures and agricultural croplands of the Wildlife Area via the Schwind, Cassady, and Rising River laterals to three points of delivery at the boundary of the Wildlife Area.

The Project site begins near the intersection of Highway 99 and the main canal (Belding lateral), north of the City of Biggs, and continues southwest past the cities of Biggs and Gridley, and terminates at the northern border of the Wildlife Area (refer to **Figure 2**). The canal is surrounded mostly by agricultural land typically used for rice production. Residential and agricultural structures, farm equipment, fencing, overhead utilities, and canal structures are located within the Project area. The canal is paralleled on both sides by an unpaved service road on the crest of a raised berm. The roads are generally dry and compacted due to the operation of farm vehicles and Water District maintenance equipment.

Figure 1. Project Vicinity



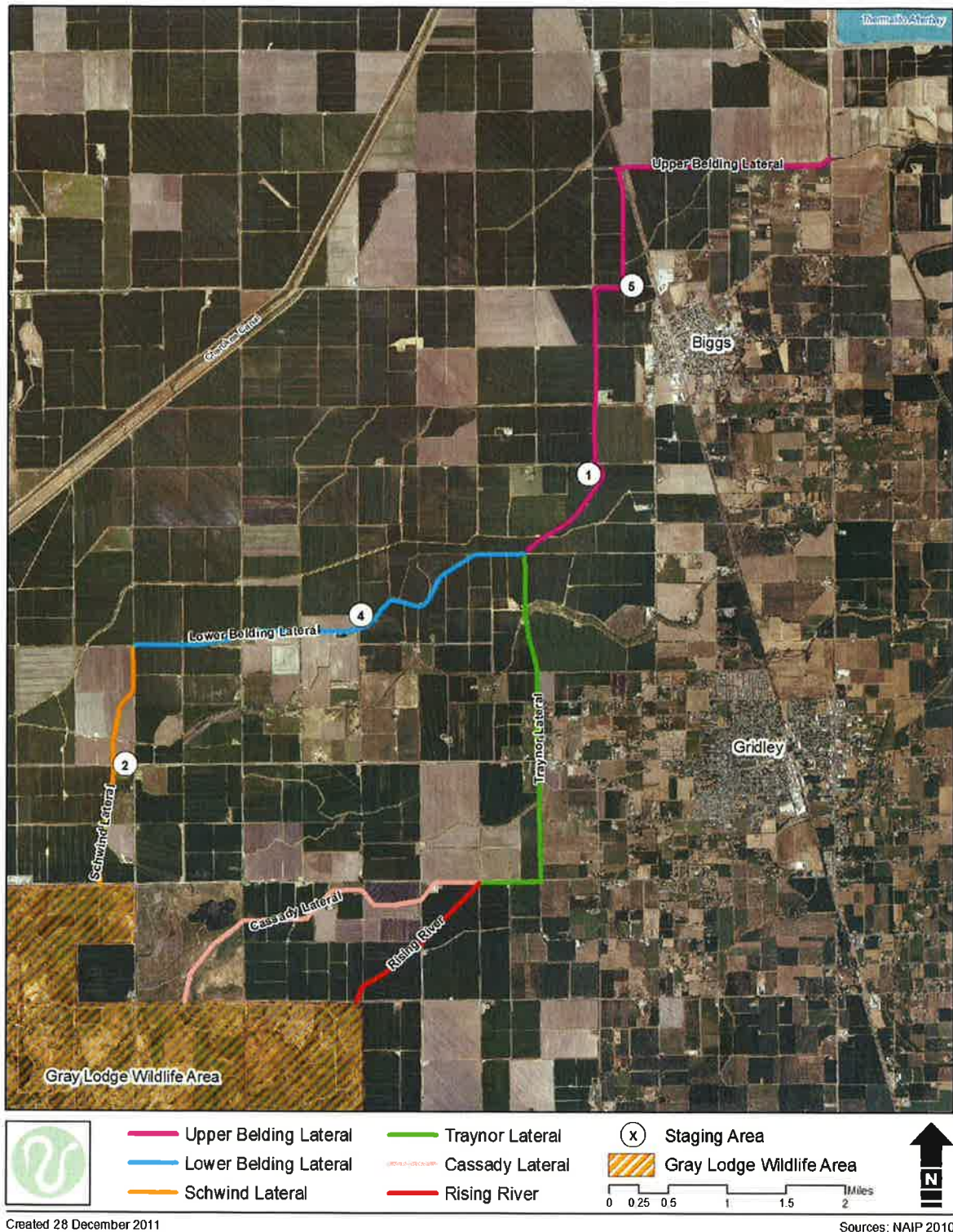


Figure 2. Project Improvement Locations and Potential Staging Areas

Description of the Proposed Project

The Project involves the structural modification of portions of the Water District's water conveyance facilities. The canal improvements would provide additional capacity required to deliver required water supplies to the Gray Lodge Wildlife Area. The Project would allow for firm, historic average annual water deliveries (Level 2) in addition to incremental amounts of water required for optimal wildlife management (Level 4) from the Central Valley Project (CVP) or State Water Project (SWP) facilities to the boundary of the Gray Lodge Wildlife Area refuge as required by the Central Valley Project Improvement Act.

The Project consists of improving or replacing minor structures along the canal, consisting of bridges, siphons, flumes, weirs, checks, and farm crossings. Improvement of the water conveyance facilities will be accomplished by retro-fitting or replacing these structures throughout the canal system, as well as by modifying canal cross-sections to improve hydraulics. The canal system will be graded to "smooth" the channel to improve its hydraulics, and portions of it will be widened to increase capacity.

The canal improvements will occur along the following laterals: Belding, Schwind, Traynor, Rising River, and Cassady (**Figure 2**). The Project comprises a linear corridor approximately 19.2 miles in length covering the length of all canals included in the Project design and a 200 foot buffer on each side of canal center line.

The identified system improvements represent agreement between Reclamation, CDFW and the Water District, reached in this stage of Project development, regarding the improvements necessary to accomplish Project objectives and mitigate Project effects. As a part of engineering design, the operational role of each major structure has been investigated cooperatively with the Water District to ensure that the specific structure type will achieve its desired function. These structure refinements will benefit the Gray Lodge Water Supply Project by enhancing the Water District's ability to run its system efficiently while reliably delivering full water supplies to the Gray Lodge Wildlife Area.

Description of Construction Activities

Construction activities will include the demolition of existing structures, excavation to accommodate new structures and channel improvements, cast-in-place concrete work, and earthwork to reshape canals so they meet design criteria. The Project includes 69 minor structural modifications (disturbing less than 0.5 acre of land each), and 25 major structural modifications (disturbing over 0.5 acre of land each). The minor modifications consist primarily of concrete structure work including improvements to or replacement of siphons, bridges, flumes, weirs, and check and head gates. The major modifications consist primarily of canal work involving raising, reshaping, or widening the canal banks, which will occur on either one or both sides of the canal, depending on the engineering requirements.

Minor Modifications

Minor structural modifications will consist of structure excavation, demolition work, concrete placement, and structure backfill. Equipment anticipated to be used to complete associated work includes Cat 322 excavator; Cat 966 wheel loader; Cat 446 backhoe; end-dump truck; concrete mixer trucks; concrete pump truck; 30-ton hydraulic crane; Cat CP323 padded drum compactor; water truck; 2-ton flatbed truck; and other pickup trucks.

Check Structures/Long-Crested Weirs - The long crested weirs will be designed such that the concrete sill elevation is 1 foot below the design sill elevation. The top 1 foot will utilize flash boards which will allow the Water District operators to adjust the weir to the correct elevation. The majority of the flow conveyed through the structure will pass through the structure gates. Additionally, the check structures will be designed to pass the design flow over the weirs (while utilizing the available freeboard) in the event that the gate is closed.

Turnouts and Lateral Headgates - Landowner turnouts and lateral headgate structures are intended to be protected in place unless one of the following reasons warrants replacement.

- *Construction activities* - Due to canal widening, bank raising, and other construction activities, some turnouts may be removed and replaced.
- *Hydraulics* - If it is determined the hydraulic performance of the turnout or lateral headgate is unacceptable, then the structure will be removed and replaced.
- *Freeboard* - In some instances freeboard is currently an issue for both turnouts and headgates. Under the proposed design, lack of freeboard may necessitate the removal or modification of these structures. If the freeboard is over 0.5 feet, then the headwall will be extended. If the freeboard is 0.5 feet or less, the structure will be removed and replaced.

Bridges/Crossings - A number of farm crossings and five county road bridges require replacement to accommodate the additional flows for the Project. Brief descriptions of the work proposed for the county road bridges and farm crossings are provided below.

- *County road bridges* will be designed as cast-in-place concrete trapezoidal sections. This will require the bridges to be built during the February to April shutdown. Butte County will require a temporary traffic bypass to be established at each site. The bypass should consist of a class II aggregate base course when outside of the paved roadway. The contractor will be allowed to bring traffic to a full stop before proceeding through the bypass. This will allow a lower design speed to be used for the bypass, thus reducing the work and land requirement. Butte County will also require the breakaway barriers and flares to

be established at each side of the bridge. The flare may be “broken” to accommodate travel along the canal banks by Water District personnel.

- *Farm crossings* will consist of two types of structures. The first will be a precast bridge supported on driven precast concrete piles. This will allow the bridge to be built while water is flowing and take the farm bridge construction out of the critical path. The second type of structure will be a double pipe culvert crossing, with rip rap inlets and outlets. The culvert crossing will be used for flows less than 100 cfs. In either instance, guardrails will not be designed as it is expected growers will bring farm equipment and implements across the bridges which could overhang the deck and would damage the guardrail. This is currently the case with all of the farm bridges.

Union Pacific Rail Road Crossing - A new 96-inch pipe will be installed at the Union Pacific Rail Road (UPRR) crossing near the head of the Belding Lateral. Key design considerations include complying with UPRR requirements and minimizing the risk of settlement or heaving. The tunnel will be located on the north side of the existing crossings, and will join the canal through a split in the channel on either side of the railroad. This will allow the crossing and headwalls to be built during the irrigation season, taking this work out of the giant garter snake inactive season.

Flumes - Five flumes are proposed for the Project, located at: Razorback and Garcia siphons, and the Fields, Nugent and Schwind flumes. The Razorback and Garcia siphons are proposed to be converted to flumes so that headloss through the crossing can be reduced and vehicular access through the crossing is improved. The flume crossings are proposed as long-throated flumes consisting of reinforced concrete lining within a trapezoidal channel. For the Fields, Nugent and Schwind flumes the culverts will be designed to match the existing cross-sectional area plus the boarded area on the sides of the existing flumes. For the Razorback and Garcia flumes the culverts will be designed to match the cross-sectional area of the nearest upstream drain crossing.

Major Modifications

Typical canal excavation and embankment work will consist of shaving off the top of the levee on one side of the existing canal and dumping that fill into the existing drainage ditch at the outside foot of the levee. The inside bank of the levee would then be excavated to broaden the width of the existing canal. The excavated material would be placed on top of the levee, smoothed and compacted. For the entire length of the Project one drive bank would receive crushed rock or a similar type of all-weather surfacing material. An excavator would then dig a new drainage ditch at the outside foot of the reshaped levee and the excavated material would be placed on top of the adjacent levee, smoothed and compacted. The existing drainage ditch would be replaced approximately 4-10 feet farther away from the canal bank. In these locations, the intent is to maintain the existing slope and channel dimensions so that function of

the drainage ditches is not altered. All work would be performed over the existing drainage ditch or from the top of the existing canal bank. Therefore, the limits of ground disturbance beyond the outer edge of the existing narrow drainage ditch will be no more than 20 feet. Maximum depth of excavation into native soil will be approximately four feet. It is anticipated the following equipment would be used to complete this work, and that multiple structures and improvement segments would likely be underway at any given time: Cat 322 excavator; side-dump trucks, end-dump truck, Cat 966 wheel loader, Cat 446 backhoe; Cat CP-323 padded drum compactor; Cat 120H motor grader; water truck, mechanics truck; and pickup trucks. The general character, range of width, and length of each canal reach to be reconstructed are summarized in **Table 1**, below.

Table 1. General width increase by reach

| Segment | Affected Area Length (Mi) | Increase in Width (Ft) | Adjacent Land Use |
|---------------|---------------------------|------------------------|---------------------|
| Upper Belding | 5.60 | 5-25 | Rice |
| Traynor | 3.32 | 10-35 | Rice, Orchard |
| Cassady | 3.12 | 0-15 | Rice, Pasture |
| Lower Belding | 3.65 | 2-10 | Rice |
| Schwind | 2.06 | 3-8 | Rice |
| Rising River | 1.47 | 5-22 | Rice, Marsh/Wetland |

Canal velocities will remain consistent with those of conveyance systems supporting giant garter snakes throughout the Central Valley. Most canals will be designed so that the maximum velocity does not exceed 3.5 ft/s. However, because it is important to minimize water levels and canal sizes, some segments of the canal system may have design velocities that exceed 3.5 ft/s. Where velocity is expected to exceed 3.5 ft/s only for short periods of time during rare high-flow events, no additional design measures may be required. Calculated velocity for normal depth at the maximum design flow rate will be allowed to be up to 4.0 ft/s for events that are expected to occur less than 1% of the time. Where velocity is expected to exceed 3.5 ft/s more than 1% of the time or will exceed 4.0 ft/s at the design flow condition, rock or gravel blankets may be used to armor the earth canal to prevent erosion. The maximum velocity criteria are summarized in **Table 2**, below.

Table 2. Velocity/Design Criteria

| Maximum Velocity | Corresponding Flow Rate | Frequency of Occurrence | Canal Design |
|------------------|---|-------------------------|--------------------------------|
| Up to 3.5 ft/s | Up to maximum design flow | Any amount | Earth |
| 3.5 – 4.0 ft/s | Greater than 90% of maximum design flow | Less than 1% of time | Earth |
| 3.5 – 4.0 ft/s | Less than 90% of maximum design flow | Greater than 1% of time | Earth armored with rock/gravel |
| 4.0 – 4.5 ft/s | Up to maximum design flow | Any amount | Earth armored with rock/gravel |

Potential Staging Areas

Up to four (4) staging areas have been identified for materials stockpiling and the storage of construction equipment. (A fifth potential staging site – originally referred to as Staging Area No. 3 – was eliminated from consideration due to the presence of wetlands.) Which of these four sites will actually be used for construction will depend upon the routing alternative selected. As depicted on **Figure 2**, the staging areas are located near the Farris Road and Belding lateral intersection, Colusa Highway and Schwind lateral intersection, Riley Road and Belding lateral intersection, and Biggs Princeton/Afton Road and Belding lateral intersection. Physical changes to farm fields would be done prior to farm operations starting in the spring of 2014.

Timing of the Proposed Project

Slated to begin in the summer of 2013, construction sequencing and staging will be subject to constraints (limited dry periods, limited right-of-way, adjacent landowner facilities, permitting, etc.). The Project is slated for completion around May 2015, providing two “dry” periods (generally the end of January to the middle of April each year) when the Water District’s system is dewatered and accessible for construction within the canal prism. The majority of construction work would be carried out during the months of January through April when the canal system is dewatered, and will be completed over two construction periods in 2014 and 2015, but could extend into 2016 or later if weather, permitting constraints, available funding, etc. delay project work. There may be additional limitations on the timeframe for construction activities because precipitation can make earthwork difficult and require supplemental dewatering. The design will be developed to incorporate between three and five phases comprising multiple bidding schedules.

Project Design Features and Mitigation Measures

The Environmental Commitment Plan (ECP)/Mitigation Monitoring and Reporting Plan (MMRP) for the Supplemental EA/Addendum has been prepared to satisfy the requirements of the NEPA and CEQA (see **Appendix H**).

The ECP/MMRP includes both Mitigation Measures (MMs) and Project Design Features (PDFs). Mitigation measures identified in the EA/IS are applied as recommended conditions of approval. The PDFs are design elements inherent to the Project that reduce or eliminate potential impacts. Because PDFs are incorporated into the Project, either in the Project design or by law as part of Project implementation, they do not constitute mitigation measures. However, the PDFs are described within the mitigation program and are described within the analysis of the Supplemental EA/Addendum. Where applicable, mitigation measures are provided to reduce potential impacts to a less than significant level.

IV. Consistency of Proposed Project with 1998 Environmental Assessment/Initial Study

Methodology

To confirm the applicability of the 1998 Findings, in the summer and fall 2011, substantial survey work was undertaken of the entire canal system alignment. Surveys included the full suite of biological resources, wetlands, endangered species habitat, and cultural resources. In addition, the engineering design team provided supplemental analyses of seepage and geologic and geotechnical considerations. The results of these surveys and investigations are summarized below.

Biological Resources

Surveys of the Project area were conducted during the fall of 1995 and 1996 to determine whether the Project may affect any federally listed or proposed species. A special focus was given to searching for habitats that might support federally listed or proposed species which are known to occur in the vicinity. These species included the giant garter snake, the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), palmate-bracted birds beak (*Cordylanthus palmatus*), and vernal pool species such as vernal pool fairy shrimp (*Branchinecta lynchei*), vernal pool tadpole shrimp (*Lepidurus packardii*), Hoover's spurge (*Chamaesyce hooveri*), hairy Orcutt grass (*Orcuttia pilosa*), Colusa grass (*Neostaphia clusana*), and Greene's tuctoria (*Tuctoria greenei*).

Based on field surveys conducted in 2009, additional biological analyses were recommended to identify and classify areas of giant garter snake habitat in the Project area, using the Project footprint to calculate temporarily disturbed and permanent loss of upland and aquatic areas.

A general biological assessment including field surveys and formal wetland delineation was completed in November 2011 in support of this environmental review process and are summarized below (included as **Appendix B**).

Cultural Resources

Each of the proposed improvements was examined to meet the current cultural resource standards of CEQA, NEPA and Section 106 of the National Historic Preservation Act (NHPA). The four facilities that were evaluated in the EA/IS were re-evaluated to insure that the findings were consistent with Reclamation's Cultural Resources program and policy as outlined in Reclamation's Directives and Standards at LND P01 and LND 02-03. An additional cultural resources assessment, including field assessment of the entire Project alignment, was completed in December 2011 and is included as **Appendix D**.

Water Seepage

A seepage monitoring and minimization plan is being completed during the final design phase of the Project in consultation with and subject to acceptance by the Water District to monitor seepage conditions post-construction and mitigate short-term and long-term seepage effects (United States Department of the Interior, United States Bureau of Reclamation, and California Department of Fish and Game, 1997).

A technical assessment of methods to be utilized for minimizing canal seepage was completed in September 2011 and is included as **Appendix E**.

Geotechnical Studies

Geological and geotechnical studies were also conducted of the Project site. These studies were used to evaluate surface and subsurface conditions to assess the potential for adverse geologic conditions that may impact the feasibility and/or constructability of the proposed structures. Additionally, these studies were performed to develop geotechnical design criteria for design of the proposed structures. Details of these studies are provided in **Appendix F**.

Environmental Consequences and Summary Findings of Supplemental Analyses

Biological Resources

The existing biological setting and potential impacts to biological resources in the Project Study Area (Study Area) were evaluated for a linear corridor covering the length of all canals included in the Project design and a 250 foot buffer on each side of canal center line. This section integrates documentation in the EA/IS and incorporates results of the 2011 surveys and assessment. A review of the Biological Resources section of the documents was conducted to evaluate special-status species occurrence potential and sensitive habitat communities associated with the Study Area. The EA/IS contained special-status plant and wildlife species occurrence tables (**Table IV-3** and **IV-4** of the EA/IS) which were reviewed and largely relied on when conducting 2011 field surveys.

Guidance for the original EA/IS Biological Resources Section was provided, in part, by the Service through joint initial site evaluation meetings conducted on November 9 and 10, 1994 for the Wildlife Area. Subsequent surveys were conducted in the fall of 1995, and September 1996. The Service provided species lists and suggested surveys be conducted to determine the effects of the action on federally-listed species, species proposed for listing, species of concern, and the habitats of these species. Information and guidance was also provided by CDFW in 1994. The Service's Endangered Species Division provided further guidance in April 1996.

Field Survey

Field surveys of the canal sections proposed for improvement were conducted in August 2011. Field surveys consisted of driving and walking along the existing dirt roads paralleling the canals that would be modified. An area 250 feet on each side of the centerline of the canal was evaluated. During the site assessment, plant and wildlife species were recorded and biological communities onsite were categorized and assessed for the potential to support special-status species. Representative ground-level photographs were also taken. Biotic communities previously classified in the EA/IS according to the California Department of Fish and Wildlife's California Wildlife Habitat Relationship System (CWHRS) - a wildlife habitat classification system for California's commonly occurring birds, mammals, reptiles, and amphibians (Mayer and Laudenslayer, 1988) - were confirmed.

During the August 2011 field surveys, a delineation of waters of the U.S. was also performed within the proposed Study Area. Where areas contained culverts or siphons, direction of flow was determined and recorded. Existing types of habitat and agricultural production were noted on aerial photographs and a species list was generated for plants observed.

California Natural Diversity Database

Special-status species considered for this analysis are based on a query of the California Natural Diversity Database (CNDDDB). The CNDDDB is a "natural heritage program" database maintained by CDFW Habitat Conservation Division that provides natural history and location information on rare, threatened, endangered, and other special-status species to the public, other agencies, and conservation organizations (CDFG 2011). **Table 3** represents the results of document review, field surveys and professional opinion in regard to potential of occurrence of all regionally occurring special-status plant and wildlife species. This table includes the common name and scientific name for each species, regulatory status (federal, state, local, CNPS), habitat requirements, and potential for occurrence within the Study Area. Only species considered potentially occurring in the EA/IS and newly listed or observed species with potential to occur are contained in **Table 3**. For an exhaustive list of regionally occurring special-status species, refer to the EA/IS (Appendix A).

Wildlife

The Wildlife Area and the agricultural region surrounding it are key areas for migratory waterfowl associated with the Pacific Flyway, attracting large numbers of ducks, geese, swans, and shorebirds during the fall and winter months. The Wildlife Area vegetation communities are actively managed habitat for waterfowl, and adjacent private wetlands and harvested rice fields are important migratory bird habitat when flooded in the winter period.

Rice lands also form an essential component of remaining habitat for the federally-listed threatened giant garter snake (*Thamnophis gigas*) (USFWS, 1999).

Aside from waterfowl, resident wildlife species include numerous amphibians, reptiles, large and small mammals, and various shorebirds, raptors, and songbirds. Wildlife habitats present in the Study Area were characterized according to *A Guide to the Wildlife Habitats of California* (Mayer and Laudenslayer, 1988). Wildlife habitats occurring within the proposed Study Area and canal corridors include annual grassland, fresh emergent wetland, pasture, riverine, and rice land.

Wetlands/Waters

Wetlands are defined for regulatory purposes as “areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adopted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas” (33 CFR §328.3(b)). Features potentially meeting the required hydric vegetation, hydric soil, and wetland hydrology criteria were observed during surveys of the Study Area. Many of these areas are artificially sustained by man-made water conveyance and the result of canal seepage, and are generally referred to as “leaky ditch” wetlands. As such, they generally do not qualify as jurisdictional waters and wetlands pursuant to ACOE definitions (Bell pers. comm.).

Similarly, some rice fields and other croplands in the Study Area are located on former wetlands, but are usually regarded as “prior-converted wetlands” by federal regulatory agencies and do not qualify as jurisdictional wetlands.

Wildlife Area Wetlands/Waters

The Wildlife Area contains hundreds of acres of permanent ponds, seasonal wetlands, irrigated diverse moist soil units (watergrass, smart weed, swamp timothy, prickly grass), and uplands. These habitat types, and particularly the wetlands, support diverse moist soil plants and invertebrate populations that serve as a food source for resident and migratory waterfowl, shorebirds, wading birds, special status species, and other wetland-dependent species. Upland areas of the Wildlife Area support large concentrations of geese, upland birds, and other wildlife species. Approximately three million ducks and one million geese utilize the wildlife areas and refuges of the Sacramento Valley, which represent approximately forty percent of the Pacific Flyway waterfowl total (<http://www.fws.gov/sacramentovalleyrefuges>).

Annual Grassland

Annual grassland is typified by the dominance of annual herbaceous species and the lack of a significant overstory. Introduced annual grasses are the dominant species of this habitat. This habitat exists within the Study Area; however, it is important to note that Water District lands are routinely mowed in order to suppress weeds and maintain staging areas associated with farming operations. While there are a few trees within the site, they do not dominate the site and provide very limited, fragmented cover. Interspersed through the annual grasses onsite are annual herbaceous weedy species, many of which are considered noxious weeds. Much of the vegetation occurring on site is introduced non-native weedy species remnant from disturbance and farming practices. At the time of the field survey, annual grass species were identifiable, and included perennial rye grass (*Lolium perenne*), soft chess (*Bromus hordeaceus*), foxtail (*Hordeum murinum*), ripgut brome (*Bromus diandrus*), foxtail fescue (*Vulpia myuros*), and wild oat (*Avena fatua*). Common dominant herbaceous non-natives included yellow star thistle (*Centaurea solstitialis*), black mustard (*Brassica nigra*), prickly lettuce (*Lactuca serriola*), Johnson grass (*Sorghum halepense*), and stork's bill (*Erodium cicutarium*).

Fresh Emergent Wetland

Fresh emergent wetlands are characterized by erected, rooted water-tolerant plant species. Emergent wetland areas flood frequently enough so that roots prosper in an anaerobic (oxygen-free) environment. This habitat type may occur in close association with other terrestrial communities including riverine, lacustrine, and riceland. Many areas have been identified as freshwater emergent wetlands within the Study Area, primarily in association with seepage ditches paralleling the main canals. These areas are well colonized by cattails, bulrush and Himalayan blackberry (*Rubus discolor*).

Wildlife species that utilize these habitat types include raccoon, striped skunk, western pond turtle, and Pacific tree frog among others. This habitat type also supports and provides habitat for a number of managed wetlands and wildlife management areas for several species of waterfowl.

Pasturelands

Pasturelands include fields of alfalfa, rice, clover, turf farms, Bermuda grass, rye grass, and other mixed and native pastures. Pasture vegetation is a mix of perennial grasses and legumes that typically form 100 percent cover. The height of vegetation depends on whether livestock have been grazing the pasturelands and how livestock are rotated (Mayer and Laudenslayer, 1988). Several areas adjacent to the Water District's canals contain residences with small pasture areas containing horses or other livestock.

Pasturelands, when occurring alone in the landscape or in association with freshwater marshes or emergent wetlands, provide substantial habitat value for various species of wildlife. In particular, this type of habitat provides excellent wintering forage for several over-wintering shorebirds that visit these fields during the non-breeding season including white-faced ibis (*Plegadis chihi*), greater sandhill crane (*Grus canadensis*), long-billed curlew (*Numenius americanus*), mountain plover (*Charadrius montanus*),

and black-necked stilt (*Himantopus mexicanus*). Swainson's hawks utilize these habitats and alfalfa fields as their prime source for foraging.

Riverine

Riverine features are characterized by at least intermittent or continually running surface water from streams and rivers. A riverine feature typically originates at some elevated source such as a spring or lake and flows downward at a rate relative to slope or gradient and the volume of surface runoff (Mayer and Laudenslayer, 1988). Riverine systems support pool and riffle habitat often with overhanging riparian vegetation and other terrestrial habitats. Riverine habitats often occur in close association with nearby emergent wetland and marsh habitats. Riverine areas are comprised of the canal system and drainage ditches, which convey water year-round to and from agricultural fields in the region.

Riverine habitat generally provides excellent habitat value to a number of nesting and foraging birds species including waterfowl, shorebirds, and raptors; foraging and roosting bat species; aquatic species such as western pond turtle (*Clemmys marmorata*), Pacific tree frogs (*Hyla regilla*), as well as fish species. These man-made artificially sustained drainage areas, though riverine in nature, are highly managed, un-vegetated, and provide marginal habitat for regional species. Without riparian vegetation or surrounding woodlands or other high value habitat types, the canal is a water source, offering little in the way of foraging opportunities for wildlife.

Riceland

Agricultural areas adjacent to the canal are comprised almost entirely of rice fields. Rice and wild rice are flood irrigated crops that are seed producing annual grasses. Commercial rice, generally, is only a couple of feet tall, whereas, commercially grown wild rice may be six feet tall or taller. Rice and wild rice are usually grown in leveled fields that are flooded much of the growing period, and dried out to mature and to facilitate harvesting. Rice and wild rice usually produce 100 percent canopy closure as they mature and are usually planted in spring and harvested in fall.

Rice often occurs in association with other croplands in the Central Valley of California and other wildlife habitats such as riparian and wetlands. Wild rice is grown similarly in the Central Valley, but also is grown in northern California where it may occur near annual grassland, riparian, wetland, and brushland habitat types.

Rice is grown usually in heavier clay soils that hold water well. Many of these soils once supported natural wetlands that historically supported an abundance of wildlife, especially waterfowl and shorebirds. Although other croplands have greatly reduced the wildlife richness and diversity in California, rice has been more compatible. Many species of wildlife and especially waterfowl, shorebirds and wading birds have adapted to rice.

Prior to the establishment of State Wildlife Areas and Federal Wildlife Refuges, waterfowl depredation of rice was extensive. The problem has been reduced; however, some species of waterfowl depend on waste rice that remains in the fields after

harvesting. Pheasants have also benefited from rice, but pheasants have experienced recent population declines owing to changes in crop patterns and cultural practices for growing small grains. Changes include clean farming, double cropping, laser leveling and straight or "squared" levees as opposed to contour levees, and chemical control of rice diseases and pests rather than leaving land fallow in alternate years. Wildlife such as waterfowl, shorebirds, and other species that use waste grains after harvest are usually not discouraged. Rice fields (flooded after harvest with waste grain and utilized for waterfowl hunting) serve as freshwater wetlands for a variety of associated wetland wildlife, including shorebirds, wading birds, and gulls (CDFG, 1999).

Riceland adjacent to and/or associated with the study area showed evidence of foraging by raccoons (*Procyon lotor*) on crayfish (*Procambarus clarkii*) by piles of scat within the study area. Localized blackbird populations would be expected to forage on the study area when the rice crop is maturing, and regionally occurring heron and egret (Ardeidae) species presumably forage on crayfish as well.

Wildlife species observed while surveying the study area included crayfish, Brewer's blackbird (*Euphagus cyanocephalus*), and signs of raccoon. Plant species observed within rice habitat included predominantly rice (*Oryza* sp.). Along rice levees was Johnson grass (*Sorghum halapense*), yellow-nut sedge (*Cyperus esculentus*), and mustard (*Brassica* sp.) among other common ruderal plant species.

Sensitive Habitats

Sensitive habitats within the study area are comprised of seasonal wetlands and other waters of the U.S. Other than the Pacific Flyway for waterfowl species, no migratory corridors utilized by deer or migratory wildlife are found to occur within the Study Area.

Special-Status Species

Special-status species are plant and animal species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and may require specialized habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

1. Listed or proposed for listing under the California Endangered Species Act (CESA) or the Federal Endangered Species Act (FESA);
2. Protected under other regulations (e.g., Migratory Bird Treaty Act);
3. CDFW Species of Special Concern;
4. Receive consideration during environmental review under CEQA.

Special-status species considered for this analysis are based on document review, results of a query of the CNDDDB, and field surveys.

Table 3 provides the common name and scientific name for each species, regulatory status, habitat descriptions, species identification period and potential for occurrence within the Study Area. The following set of criteria has been used to determine each species' potential for occurrence on the site:

- **Present:** Species is known to occur on the site, based on CNDDDB records, and/or was observed onsite during the field survey(s).
- **High:** Species is known to occur on or near the site (based on CNDDDB records within a five-mile radius of the site, and/or based on professional expertise specific to the site or species) and there is suitable habitat onsite.
- **Low:** Species is known to occur in the vicinity of the site, and there is marginal habitat onsite. **-OR-** Species is not known to occur in the vicinity of the site, however there is suitable habitat onsite.
- **No:** Species is not known to occur on or in the vicinity of the site and there is no suitable habitat for the species onsite. **-OR-** Species was surveyed for during the appropriate season with negative results. Only those species that are known to be present, have a high potential for occurrence or have a low potential for occurrence are discussed further in **Table 3**.

Table 3. Special-Status Species Potentially Occurring within the Proposed Gray Lodge Wildlife Area Water Supply Study Area, Butte County, CA

| Special-Status Species | Regulatory Status (Federal; State; Local; CNPS) | Habitat Requirements | Identification Period | Potential for Occurrence |
|--|---|--|--|---|
| Plants | | | | |
| Brazilian watermeal <i>Wolffia brasiliensis</i> | --;--;1B | Marshes and swamps and assorted freshwater areas from 90 to 300 feet above mean sea level (MSL). | April - December | No; Suitable habitat occurs within the Study Area, but the species was not found during surveys. |
| Brown fox sedge <i>Carex vulpinoidea</i> | --;--;2 | Marshes and swamps, riparian woodlands from 90 to 3,600 feet above MSL. | May – June | No; Suitable habitat occurs within the Study Area, but the species was not found during surveys. |
| Sanford's arrowhead <i>Sagittaria sanfordii</i> | --;--;1B | Assorted shallow freshwater marshes and swamps. | May - October | No; Suitable habitat occurs within the Study Area, but the species was not found during surveys. |
| Woolly rose-mallow <i>Hibiscus lasiocarpus</i> | --;--;2 | Marshes and swamps, freshwater areas from 0 to 360 feet above MSL. | June - September | No; Marginal habitat occurs within the Study Area, but the species was not found during surveys. |
| Wildlife | | | | |
| Amphibians/Reptiles | | | | |
| Giant garter snake | FT;CT;--;-- | Agricultural wetlands and other wetlands such as irrigation and | Optimal detection early spring through | Present; Although the species may not prefer habitat within the canal, |

| Special-Status Species | Regulatory Status (Federal; State; Local; CNPS) | Habitat Requirements | Identification Period | Potential for Occurrence |
|---|---|---|--|--|
| <i>Thamnophis gigas</i> | | drainage canals, low gradient streams, marshes, ponds, sloughs, small lakes, and their associated uplands. Upland habitat should have burrows or other soil crevices suitable for snakes to reside during their dormancy period (November – mid March). | mid fall (about mid March - early November) during their active period. | areas adjacent are suitable habitat and the species is known to occur within the region. Surveys conducted by the CDFW in 2012 verified the presence of GGS at the Gray Lodge Wildlife Area, which is located adjacent to the Project area. This study yielded 12 occurrences of GGS in a relatively small portion of the wildlife area (Lorna Dobrovoly, Pers. Comm.. Jan 3, 2013). |
| Western pond turtle <i>Actinemys marmorata</i> | --;CSC;--;-- | Occurs in permanent or nearly permanent water in a wide variety of habitat types. | Year-round | Low ; Known to occur in agricultural areas and regional drainages associated with the Study Area. Marginal foraging and basking sites occur within the Study Area. |
| Birds | | | | |
| Greater sandhill crane <i>Grus canadensis tabida</i> | --;CT;--;-- (nesting and wintering) | Nests in wet meadows interspersed with emergent marsh habitat. Winters in agricultural croplands and irrigated pastures. | Wintering: September - January Nesting: This species regularly nests in Northeastern California | Low : This species is regularly found in the winter, in pastures and harvested rice fields within Butte County. The study area is not likely to provide suitable nesting habitat for this species. |
| Northern harrier <i>Circus cyaneus</i> | --;CSC;--;-- | Mostly nests in emergent wetland or along rivers or lakes, but may nest in grasslands, grain fields, or on sagebrush flats several miles from water. | Nesting: April-September | Low ; Marginal nesting habitat occurs within and adjacent to the Study Area. |

| Special-Status Species | Regulatory Status (Federal; State; Local; CNPS) | Habitat Requirements | Identification Period | Potential for Occurrence |
|--|--|--|--|---|
| Swainson's hawk <i>Buteo swainsoni</i> | --;CT;--;-- (nesting) | Nests in isolated trees or riparian woodlands adjacent to suitable foraging habitat (agricultural fields, grasslands, etc.). | Nesting: early March - early September | Low ; There is suitable nesting habitat within 10 miles of the Study Area. Minimal foraging areas occur adjacent to the canal. |
| Tricolored blackbird <i>Agelaius tricolor</i> | --;CSC;--;-- (nesting colony) | Nests in dense blackberry, cattails, tules, willows, or wild rose within emergent wetlands throughout the Central Valley and the foothills surrounding the valley. | Nesting: mid-April - late July | No ; There is no suitable habitat within or adjacent to the Study Area for this species. |
| White-faced ibis <i>Plegadis chihi</i> | --;CSC;--;-- (nesting) | Prefers to nest in dense marsh vegetation near foraging areas in shallow water or muddy fields. Extensive marshes required for nesting. | Nesting: May-July | No ; There is no suitable nesting habitat within the Study Area; although the species was observed during field surveys. |
| Other Raptors (Hawks, Owls and Vultures) | MBTA and §3503.5 California Department of Fish and Game Code | Nests in a variety of communities including cismontane woodland, mixed coniferous forest, chaparral, montane meadow, riparian, and urban communities. | Nesting: February – September (Most nesting raptors are found in large trees but some nest on ground.) | Low ; Marginal nesting habitat for some regionally occurring raptor species are present in and adjacent to the Study Area. |

Federally Listed Species:

FE = federal endangered

FT = federal threatened

FC = candidate

PT = proposed threatened

FD = delisted

California State Listed Species:

CE = California state endangered

CT = California state threatened

CR = California state rare

CSC = California Species of Special Concern

CNPS* List Categories:

1A = plants presumed extinct in California

1B = plants rare, threatened, or endangered in California and elsewhere

2 = plants rare, threatened, or endangered in California, but common elsewhere

3 = plants about which we need more information

4 = plants of limited distribution

Other Special-Status Listing:

SLC = species of local or regional concern or conservation significance

Source: Foothill Associates, 2011 (See Appendix B).

Based upon review of documentation results for previously conducted studies, a query of regionally occurring special-status species recorded in the CNDDDB, and results of field surveys of the Study Area and adjacent areas by Foothill Associates' wildlife biologists, most species known to occur regionally and listed by the Service have no potential to occur in the Study Area.

Special-Status Plant Species

Although suitable habitat types occur in the Survey Area for regionally occurring special-status plant species, no special-status plant species were observed in the Study Area. Due to the highly manipulated landscape and high prevalence of invasive weeds and ruderal marginal highly disturbed habitat areas within the Study Area, special-status plant species are highly unlikely to occur and further surveys for special-status plant species are not necessary.

Special-Status Wildlife Species

The special-status wildlife species potentially occurring within the Study Area include the following species: giant garter snake (*Thamnophis gigas*) and northwestern pond turtle (*Actinemys marmorata*); regionally occurring raptors including Swainson's hawk (*Buteo swainsoni*) and northern harrier (*Circus cyaneus*); and, nesting birds protected by the Migratory Bird Treaty Act (MBTA), including cliff swallow (*Petrochelidon pyrrhonota*). Several other species with potential for occurrence, but determined not to be present within the Study Area by onsite field surveys, are also listed in **Table 3**.

Giant Garter Snake

Giant garter snake (GGS) is an endemic species to wetlands in the Central Valley of California. Historically, GGS was found in the Sacramento and San Joaquin Valleys from the vicinity of Butte County southward to Buena Vista Lake, near Bakersfield in Kern County. Currently, populations of GGS are found in the Sacramento Valley and isolated portions of the San Joaquin Valley (Service, 1999). This species historically inhabited natural wetlands and now occupies a variety of agricultural, managed, and natural wetlands. GGS was listed as a federally-listed threatened species in 1993.

CDFW studies indicate that GGS populations are distributed in portions of the rice production zones of Sacramento, Sutter, Butte, Colusa, and Glenn counties (Service, 1999). A survey conducted by CDFW in 2012 verified the presence of GGS at the Gray Lodge Wildlife Area, which is located adjacent to the Project area. This survey yielded 12 occurrences of GGS in a relatively small portion of the wildlife area. (Lorna Dobrovolny, personal communication, January 3, 2013).

Giant garter snakes feed primarily on aquatic prey such as fish and amphibians. GGS are most active from early spring, when they emerge from overwintering sites, through mid-fall (generally April through November) (Service, 1999). Annual fluctuations in weather and temperature may result in variances from seasonal norms, such as short distance movement on warm winter days or early emergence from overwintering sites.

Essential habitat for GGS includes "agricultural wetlands and other waterways, such as irrigation and drainage canals, ricelands, marshes, sloughs, ponds, small lakes, low

gradient streams, and adjacent uplands in the Central Valley. Essential habitat components consist of: (1) adequate water during the snake's active season (early spring through mid-fall) to provide adequate permanent water to maintain dense populations of food organisms; (2) emergent, herbaceous wetland vegetation, such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) for escape cover and foraging habitat during the active season; (3) upland habitat with grassy banks and openings in waterside vegetation for basking; and (4) higher elevation upland habitats for cover and refuge from flood water during the snake's inactive season in the winter (Service, 1999).

GGs appear to be most numerous in rice growing regions. GGS can thrive in these artificial ecosystems because the spring and summer flooding and fall dry-down of rice fields closely coincides with the biological needs of this species (Service, 1999). GGS utilize agricultural waterways for movement, foraging, and feeding and are able to use rice fields during most stages of the year for part of their biological needs.

The Study Area contains suitable habitat for GGS, is in close proximity to records of GGS, is within the Sacramento Valley Recovery Unit for this species, and the species is known to be present within the Survey Area (see **Appendix B**).

In conformance with the recommendation that a Service-approved biologist conduct a more in-depth field survey to identify and classify areas of GGS habitat in the study area, potential habitat was evaluated by a Service-approved biologist in April of 2011. Twenty-two variables associated with GGS habitat were evaluated using geographical information system (GIS) software. The assessment culminated in a database file depicting cumulative habitat scores for each feature. Reaches within the entirety of the Project alignment have been projected as linear features on maps and classified according to cumulative habitat score to show suitability for GGS. For this analysis, habitat evaluation criteria were based on recognized minimum ecological requirements for GGS (see **Appendix C**). Each criterion was scored, with a final numerical total represented categorically using GIS. All results were then confirmed with a visual assessment of habitat. This evaluation provides a series of GIS-generated maps illustrating habitat value by colored code, supporting a detailed classification, by trait, of habitat variables within the Project alignment. Representative photographs of all Project features are provided in **Appendix C**.

Scoring methodologies are modified from the Service's 1999 *Draft Recovery Plan for the Giant Garter Snake* (refer to Appendix D of **Appendix C Giant Garter Snake Habitat and Impact Assessment**). The evaluation form has been updated for a higher degree of rigor in assessing habitat value, incorporates a step-wise scale to reduce scoring ambiguity, and is modified for use in GIS analyses. For scoring the values of specific habitat attributes, these assessments include aquatic and upland habitat within 200 feet of identified ditches, drains, channels, or swales.

Along the Project alignment, potential habitat consists of the amalgamation of ditches and drains constituting the regional water conveyance infrastructure. At the time of this analysis, approximately 100,931 linear feet of potential habitat were present along the Project alignment. Of this potential habitat, 81,411 feet (81 percent) were deemed

suitable and 19,520 feet (19 percent) were deemed marginal. No features within the Project alignment were deemed unsuitable. Linear distances and relative proportions of habitat suitability classes along individual reaches of the Project alignment (see **Figure 2**) are summarized below in **Table 4**.

Table 4. Summary of Giant Garter Snake Habitat within the Project Alignment

| Alignment Reach | Linear Distance in Feet (% of total) | | |
|-----------------------|--------------------------------------|---------------|---------|
| | Suitable | Marginal | Total |
| Upper Belding Lateral | 29,650 (99.8) | 59 (0.2) | 29,709 |
| Traynor Lateral | 12,904 (73.8) | 4,580 (26.2) | 17,484 |
| Rising River | 763 (9.8) | 6,986 (90.2) | 7,749 |
| Lower Belding Lateral | 15,950 (83.6) | 3,119 (16.4) | 19,069 |
| Schwind Lateral | 9,130 (85.4) | 1,556 (14.6) | 10,686 |
| Cassady Lateral | 13,014 (80.2) | 3,220 (19.8) | 16,234 |
| Alignment Total | 81,411 (80.7) | 19,520 (19.3) | 100,931 |

Summary of Impacts

Project construction would result in both temporary and permanent changes to upland and aquatic GGS habitats. The Project would result in a net permanent loss of 1.15 acres of GGS habitat (a loss of 1.32 acres of aquatic habitat, and a gain of 0.17 acres of upland habitat, once re-establishment occurs). It would also result in the temporary loss of a total of 48.22 acres of GGS habitat (24.31 acres of aquatic habitat and 23.91 acres of upland habitat).

The Service Memorandum (Service file 81420-2009-TA-1164-1, Concurrence to Append the 1998 BO) specifies that the Project shall not exceed 22 acres (11 acres of aquatic and 11 acres of upland) and that the total cumulative amount of permanent giant garter snake habitat loss for all projects listed in Appendix A of the 1998 BO does not exceed 24.5 acres of upland habitat or 29.5 acres of aquatic habitat (the total acreage for all projects addressed by the Opinion). The total permanent impact acres associated with the Project are well within the limits expressed in the 1998 BO. [See Appendix G(1) and G(2).]

Minor Modifications - Minor Modifications are expected to impact only upland or terrestrial habitats. Temporary impacts from Minor Modifications are associated with structure excavation, demolition work, and structure backfill. Permanent impacts will result mainly from the two-foot increase in bank surface required to accommodate the increased delivery capacity, and represent a net gain in available upland. Minor modifications will result in a maximum 0.01 acre of permanent impacts and 0.03 acres of temporary impacts per each of 69 structures, generating 0.69 acres of permanent impacts (gain) and 2.07 acres of temporary impacts (loss) in total (**Table 5**). Most of the

earthwork would be done during the irrigation season, while the structural work would be done during the winter shutdown.

Table 5. Summary of impact acreages by duration and habitat type

| Alignment Reach or Feature | Permanent Impacts | | Temporary Impacts | |
|--------------------------------------|---------------------|---------------------|----------------------|----------------------|
| | Upland Acreage | Aquatic Acreage | Upland Acreage | Aquatic Acreage |
| Minor Modifications | | | | |
| Upper Belding | 14 x +0.01 = +0.14 | 0 | 14 x -0.03 = -0.42 | 0 |
| Lower Belding | 11 x +0.01 = +0.11 | 0 | 11 x -0.03 = -0.33 | 0 |
| Schwind | 11 x +0.01 = +0.11 | 0 | 11 x -0.03 = -0.33 | 0 |
| Traynor | 14 x +0.01 = +0.14 | 0 | 14 x -0.03 = -0.42 | 0 |
| Cassady | 14 x +0.01 = +0.14 | 0 | 14 x -0.03 = -0.42 | 0 |
| Rising River | 5 x +0.01 = +0.05 | 0 | 5 x -0.03 = -0.15 | 0 |
| Net Impacts | +0.69 (Gain) | 0 | -2.07 (Loss) | 0 |
| Major Modifications | | | | |
| Upper Belding | +1.37 | -4.04 | -4.15 | -5.72 |
| Lower Belding | +1.75 | 2.40 | -5.32 | -2.99 |
| Schwind | +1.00 | 0.65 | -3.00 | -0.68 |
| Traynor | -4.75 | 1.75 | -3.90 | -4.63 |
| Cassady | +0.10 | -1.22 | -4.53 | -4.15 |
| Rising River | +0.70 | -0.86 | -2.11 | -2.67 |
| Gross Impacts | +0.17 | -1.32 | -23.01 | -20.84 |
| Correction Factor¹ | -(0.69) | -(0.00) | -(-2.07) | -(0.00) |
| Net Impacts | -0.52 (Loss) | -1.32 (Loss) | -20.94 (Loss) | -20.84 (Loss) |
| Staging Areas | | | | |
| Staging Area 1 | 0 | 0 | 0 | 2.44 |
| Staging Area 2 | 0 | 0 | 0.15 | 0.46 |
| Staging Area 4 | 0 | 0 | 0.63 | 0 |
| Staging Area 5 | 0 | 0 | 0.69 | 0.57 |
| Net Impacts | 0 | 0 | -0.90 (Loss) | -3.47 (Loss) |
| All Modifications | | | | |
| Total | +0.17 (Gain) | -1.32 (Loss) | -23.91 (Loss) | -24.31 (Loss) |

¹ Because initial calculations of impacts resulting from Major Modifications include all features, upland impacts for Minor Modifications are subtracted from Major Modification impacts to eliminate double counting. Because aquatic impacts for Minor Modifications are included in the Major Modification totals, the correction factor for aquatic impacts is set to zero.

Major Modifications - Major Modifications would occur during the winter and spring season when the Water District's system is dewatered and accessible for construction within the canal prism (generally the end of January to the middle of April each year). Upland habitat loss and temporary disturbance associated with the 25 Major Modifications would occur on levee roads and on ingress/egress routes bordering the Project alignment. The upland habitat along the majority of canal banks support ruderal vegetation that could provide cover for snakes, and ground squirrel burrows, rip rap, and soil crevices that are suitable for occupation by snakes during winter dormancy and periods of brief aestivation during their spring and summer active season (e.g. - while thermoregulating or molting). Construction of the Major Modifications would result in a temporary disturbance to 20.94 acres of upland habitat and a permanent loss of 0.52 acres of upland habitat once re-establishment occurs (**Table 5**).

Aquatic habitat loss and temporary disturbance would occur along the drainage ditches and the rice fields abutting them. The existing ditches are primarily occupied by cattails (*Typha* sp.), which will be temporarily removed during Project construction but will be replaced in-kind and allowed to re-establish since this drainage canal will not be maintained following construction. Adjacent cropland that is currently used for rice production would be removed to widen the canal, thereby converting aquatic rice field habitat to aquatic cattail marsh habitat. Although cropland that is currently used for rice production would be permanently reduced, this will be offset by the increase in water surface associated with widening the canals. The total amount of temporary disturbance to aquatic giant garter snake habitat for the canal widening, including staging areas, the temporary removal of cattail marsh and the conversion of rice field to cattail marsh, is 20.84 acres. The total amount of permanent loss of cropland that is currently used for rice production is 20.34 acres (**Table 5**). The total gain in water surface throughout the entirety of the canal system is 19.02 acres.

Construction of the Project would result in direct, adverse effects to all snakes inhabiting or otherwise utilizing the 1.15 acres of habitat to be permanently lost and the 48.22 acres of habitat to be temporarily lost. The 1.15 acres of habitat to be permanently lost will be fully mitigated as determined by the Service and CDFW. The BO requires that permanent habitat loss shall be compensated through habitat preservation at a 3:1 replacement ratio, which equates to 3.45 acres for the Project. Construction would remove vegetative cover and basking sites, fill and crush burrows and crevices, decrease the availability of aquatic prey, obstruct snake movement, and significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The permanent loss of 1.32 acres of aquatic habitat (rice land) will reduce the amount of foraging habitat available for snakes within the area. The Project could result in the disturbance and displacement of all snakes in the Project area, and may result in the injury or mortality of snakes. Individual snakes may be killed during construction, particularly during the inactive season when they are occupying underground burrows or crevices and are more susceptible to direct effects, especially during excavation.

Construction of the Project may result in indirect, adverse effects to giant garter snakes through increased risks of road mortality associated with construction traffic. Work will not disrupt spring and summer water deliveries; therefore, no indirect effects (e.g. disruptions to normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering) that might result from reductions in local or regional rice growing are expected to occur. No quantifiable, indirect impacts resulting from the Project are identified.

Staging Areas

Staging Areas Number 1, 2, and 5 are located within active rice fields, while Staging Area Number 4 is confined to a weedy swath of fallow upland adjacent to an active rice field. Because all four Staging Areas are located either within active rice fields or in uplands adjacent to active rice fields, giant garter snakes and/or their habitat may be impacted. Impacts to aquatic and upland habitats within the staging areas would be temporary, as farm operations would resume and habitats would re-establish after construction is completed. The approximate acreage of aquatic and upland habitat at each Staging Area was made based on GIS-based calculations made from location files provided by Provost and Pritchard Consulting Group.

Northwestern Pond Turtle

Northwestern pond turtles are a federal species of concern and a California species of special concern. Northwestern pond turtles occupy perennial water features (e.g. marshes, ponds, and slow reaches of streams and rivers) and require adjacent dry upland habitats for basking sites, breeding, and overwintering (Zeiner et. al., 1988). This species is active year-round, although the level of activity is generally reduced in colder months (October-February). Adults have been found at distance of over 1 km from water and overwintering may extend up to 500 meters from watercourses (Holland 1994). Eggs are laid in open areas, usually with compact soils, sparse grasses or other vegetation, and a generally south-facing exposure. Egg-laying occurs from late April-July. Hatchlings may overwinter in the nest or nearby vegetation in some areas. Agricultural ditches and drainages provide marginal habitat and prey base for the species. Therefore, there is a low potential the species may occur within the Study Area.

Raptor Species

Raptor species are known to forage and nest within this region. Swainson's hawk is unexpected to nest in the vicinity of the Study Area and has low potential to forage in some areas of the Study Area. Raptor species expected to occur in or adjacent to the Study Area include northern harrier (*Circus cyaneus*) and great horned owl (*Bubo virginianus*), and other raptor species have the potential to occur in the Study Area. Raptor nests are protected under the MBTA and Section 3503.5 of the California Fish and Game Code. The few mature trees occurring within and adjacent to the Study Area are suitable nesting habitat; additionally northern harrier is known to nest on the ground in marsh and wetland areas associated with emergent vegetation. Therefore, raptor species have a high potential to occur within the Study Area.

Migratory Birds

Migratory bird species forage and nest in a variety of habitats throughout Butte County. Migratory birds and their nests are protected under the MBTA, which makes it illegal to “take” migratory bird species. The emergent wetland vegetation including cattail (*Typha* sp.) and bulrush (*Scirpus acutus*) within and adjacent to the Study Area provide nesting habitat for several blackbird species; although tri-colored blackbird, a California species of concern, is unlikely to nest in the relatively small stands of emergent vegetation observed in the study area. Additionally, cliff swallows were observed nesting on several canal crossing structures. The species frequently builds mud nests on the bottom of bridges where it can easily forage over water and rice fields. Nesting migratory birds were determined to be present within the Study Area.

V. Recommendations

Mitigation measures to address the concerns of the above mentioned biological resources are carry-over from the original mitigation measures prescribed to the Project in the EA/IS, as the environment and biological resources associated with the Study Area appear relatively unchanged since 1997. The sole exception is that biological resource mitigation measure BR-11 has been replaced with BR11A, a new mitigation measure (See **Table 6**). Additionally, a variety of Project design features (PDFs) are included in the Project to aide in minimizing the environmental impacts of the Project. **Appendix H** provides details of each mitigation measure and Project design feature.

Giant Garter Snake

The Project may result in impacts to both aquatic and upland habitat for GGS, a state and federally listed threatened species. These snakes are particularly vulnerable to construction impacts during the inactive season (approximately October 1 to May 1); and direct mortality may occur during clearing, grading and excavating activities if encountered. These impacts are considered potentially significant, so mitigation is required. Mitigation measures BR 10 and BR – 11A, as shown in **Table 6** (and presented in **Appendix H**) would reduce impacts to GGS to a **less than significant level**.

Northwestern Pond Turtle

The Project may result in impacts to both aquatic and upland habitat for northwestern pond turtle. The turtle species nests and over-winters in upland habitats such as grassland adjacent to summer aquatic habitats. This species could occur in the canal, associated drainages, and associated upland habitat. Temporary construction impacts that may impact this species include the de-watering of the canal and associated drainages, presence of heavy equipment, placement of rip-rap, and earthmoving activities. Because this species is extremely wary of humans, adult pond turtles that

may be in aquatic habitats during summer months are likely to move away from the area during Project construction activities. Following construction, upland habitats will be re-vegetated and this species would be able to return to the area. These impacts are considered less than significant and implementation of **Project Design Feature 1** addresses potential impacts to this species (**Appendix H**).

Raptors

Mature trees within and in the vicinity of the Study Area have the potential to provide suitable nesting habitat to raptor species, including Swainson's hawk, northern harrier, and great horned owl. Swainson's hawk is a state listed threatened species. Other raptor species are protected by Section 3503.5 of the California Fish and Game Code, which states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes (diurnal birds of prey) or Strigiformes (owls) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Construction activities have the potential to disturb or harass nesting raptors to the point of nest failure, which is "take". These impacts are considered potentially significant impacts. However, mitigation measures identified in **Appendix H** will reduce impacts to raptors to a **less than significant level**.

Nesting Migratory Birds Including Cliff Swallows

Active cliff swallow nests were observed under several existing bridges and structures associated with the canal. Construction activities are expected to include the demolition and replacement of bridges and structures within the Study Area which may support nesting cliff swallows. Additionally, other passerine bird species have the potential to nest within the various habitat types associated with the Study Area. As migratory bird species, the cliff swallow and many other passerine bird species are protected under the MBTA and therefore certain measures shall be implemented to ensure that these species are not adversely affected by the Project. Implementation of **Project Design Features 2, 3, 4, and 5** will address the potential impact to these species (See **Appendix H**).

Jurisdictional Waters of the United States and Waters of the State and Wetlands

The Study Area supports potential jurisdictional waters of the United States. Some jurisdictional waters may be filled during canal improvement activities. Additionally, some jurisdictional waters may be temporarily affected by construction activities associated with staging and bridge and water conveyance structure replacement. Waters of the U.S. are regulated by the ACOE, Regional Water Quality Control Board (RWQCB), and CDFW. This impact is therefore considered potentially significant and is subject to mitigation. Prior to permanent or temporary fill of waters of the U.S., the following mitigation measures are required.

Mitigation Measures BR-15 and BR-16 (See **Table 6**) require pre-construction consultation for wetlands delineation and jurisdiction waters pursuant to Section 404

permitting with the ACOE have been completed (See **Appendix I**). Based on Project review, the ACOE has determined that the proposed activities on the existing irrigation supply canal system are exempt in accordance with the ACOE's regulations at 33 CFR 324.3(a)(3), and no permit is required for the construction and maintenance activities. Implementation of these mitigation measures would reduce impacts to jurisdictional waters to a **less than significant level**.

Similarly, wetland habitats will be mitigated to a less than significant level by implementation of mitigation measures BR-17, BR-19, and BR-20 (See **Table 6**).

Cultural Resources

"Cultural resources" is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties, sites of religious and cultural significance, modified landscapes, etc. The National Historic Preservation Act (NHPA) (16 USC 470) of 1966 is the primary federal legislation that outlines the federal government's responsibilities with regard to cultural resources. Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources listed on or eligible for inclusion in the National Register of Historic Places (NRHP). Those resources that are on or eligible for inclusion in the National Register are referred to as historic properties.

The Section 106 process is outlined in the federal regulations at 36 Code of Federal Regulations (CFR) Part 800. These regulations describe the process that federal agencies must take to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. As the NEPA lead agency, Reclamation must first determine if the action has the potential to affect historic properties. If so, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, consult with the State Historic Preservation Officer to seek concurrence on Reclamation's findings, and seek to resolve any adverse effects through either avoidance, Project modification, or mitigation through a Memorandum of Agreement. Reclamation sent a letter (pers. comm.) to the SHPO requesting comments on their proposed finding that the Project "would result in no historic properties being affected". No response was received from the SHPO, so Reclamation has completed the Section 106 process for this Project.

CEQA is the primary State statute protecting cultural resources for projects involving State or local agencies. The CEQA process seeks to identify cultural resources that are significant and are eligible for inclusion in the California Register of Historical Resources (CRHR) (California Public Resources Code [PRC] Section 21084.1). The guidelines for considering impacts to cultural resources under CEQA are located in CEQA Guidelines Section 15064.5. If actions result in significant impacts to resources eligible for inclusion in the CRHR, these effects must be mitigated through prescribed procedures. According to the CEQA guidelines, if a cultural resource is eligible for inclusion in the NRHP, it is eligible for inclusion on the CRHR; and the Section 106 process can be used to cover impacts to cultural resources under CEQA.

Affected Environment

The EA/IS identified no effect to cultural resources for the selected alternative. Since 1997, there have been amendments to both the NHPA statute and the Section 106 implementing regulations (36 CFR §800). Cultural resource investigations were carried out in advance of this action in an effort to address statutory and regulatory amendments and address any potential impacts to cultural resources that were not previously identified. These investigations, which were carried out in accordance with the Secretary of Interior's Guidelines for Archaeology, included a records search, outreach with the Native American community in coordination with the California Native American Heritage Commission, a pedestrian survey, and an architectural/built environment inventory. The results of these identification efforts are detailed in **Appendix D**. In summary, no cultural resources eligible for inclusion in the National Register or the California Register were identified.

Reclamation is the lead federal agency tasked with compliance for Section 106 of the NHPA. Reclamation has committed to completing the Section 106 process prior to ground disturbance. Reclamation will consult with the California State Historic Preservation Office (SHPO) seeking their concurrence on the recommended finding. Reclamation will seek to resolve any adverse effects to historic properties identified in consultation with the SHPO through avoidance, project modification, or mitigation through a MOA. As a result, the alternative will result in no impact to cultural resources.

Recommendation

Although no Native American artifacts or cultural deposits were found during the field inspection, there are verbal and archival reports of isolated Native American artifacts found in the vicinity of Potential Staging Area 3 (PSA-3) and in the vicinity of proposed new canal construction for Alternative-2 between West Liberty Road and the Cassady lateral. The study recommends that an archaeologist, who meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric archaeology, monitor any ground disturbing activities in both areas. *[Note: Subsequent to this assessment, PSA-3 was eliminated from further consideration.]*

There is a low probability for encountering buried archaeological resources once ground disturbance is underway. However, in the unlikely event that significant buried archaeological resources are encountered during such activities, the study recommends that an archaeologist meeting the Secretary of the Interior's professional qualifications standards in prehistoric or historical archaeology, as appropriate, assess the importance of any find and recommend a course of action that would mitigate any adverse effects, if appropriate.

Under §7050.5 of California's Health and Safety Code, if human remains are encountered, all work must cease in the immediate vicinity of the find and the County Coroner must be notified. No further disturbance of the find shall occur until the coroner has made the necessary findings as to origin and disposition of the remains and any grave goods pursuant to PRC §5097.98. If the coroner determines that no investigation

of the cause of death is required and if the remains are of Native American origin, the coroner will notify the Native American Heritage Commission, which in turn will inform a most likely descendant. The descendant will then recommend to the landowner appropriate disposition of the remains and any grave goods.

Water Seepage

Design studies conducted for the EA/IS assessed potential seepage problems from use of the Water District's canals to convey water to the Wildlife Area. These studies established a baseline of water levels and flows in the Water District canal system and examined whether higher water levels in the canals correlate with increased seepage to adjacent fields (refer to **Appendix A** – for the complete EA/IS and its appendices).

Affected Environment

Additional technical research was conducted for the Project under consideration in this Supplemental EA/Addendum regarding the strategies for minimizing changes in canal seepage as a result of Project implementation (see **Appendix E**). This report summarized Project-specific design features to be implemented during Project construction and operation to control, measure, and maintain water levels in the affected canals along the Belding, Schwind, Traynor, Rising River, and Cassady laterals. It is important to note, a high water table in irrigated fields can exist for several reasons other than seepage from irrigation canals. The design team is documenting existing locations that suggest areas of high water table, poor drainage, or crop production problems that are located within the study area.

Recommendation

Based on previous design reports for the EA/IS, and in conjunction with the current design report underway, the Project has been conditioned to avoid adverse impacts to the Water District, its facilities, its operations, its customers, or others as a result of the Project. Increasing water capacity in the existing system has been designed to avoid unnecessary increased seepage from the canals into adjacent farmlands. This is of particular consideration during the field preparation and harvest seasons (April-June and August-September).

A reliable baseline estimate of current seepage from the canal system is required in order to evaluate the effectiveness of Project design features. Two basic pieces of information are required to evaluate the effects of seepage:

1. The rate of migration of water out of the canal as a function of the water level in the canal; and
2. The response of the water table in the land adjacent to the canal to changes in canal elevation.

The following have been identified as Project design features that can prevent and/or manage seepage:

1. Canal lining: In areas where seepage may present a problem, the canal can be partially lined with concrete or a geomembrane to prevent seepage.
2. Cut-off Walls: A soil-bentonite or cement-bentonite slurry wall can be excavated either through the center or at the downstream toe of the canal.
3. Seepage Canals: An interceptor ditch is maintained along the canal and water can be pumped back into the canal using a relief well.
4. Conducting ponding tests to determine the amount of seepage from the canal.
5. Measurement of the water table elevation adjacent to canals at selected locations.

VI. Conclusions

Review of the impact analysis for each resource topic area of the EA/IS analysis and the Project analysis of the Supplemental EA/Addendum No.1 are summarized in **Table 6**. Based upon the analyses presented below, it is concluded that the Project is within the scope of the EA/IS and this Supplemental EA/Addendum fulfills the NEPA and CEQA review requirements (42 U.S.C. 4321 *et seq*, 40 CFR 1508.9, 43 CFR 46.300-325, 516 DM 1.12, and State CEQA Guidelines §15164). All but one of the applicable and relevant mitigation measures to the Project that were identified in the EA/IS are incorporated herein (See Section III-16-20, **Appendix A**). The one mitigation measure that no longer applies is BR-11, the condition that “no grading or excavation, or filling will take place within 30 feet of GGS habitat between October 1 and May 1.” During the design phase, it was determined that the Project would be significantly more cost effective, efficient and reduce impacts on water deliveries to Water District members by performing most of the grading, filling and excavation activities during the Water District’s outage period (generally between January through April) when the conveyance facilities are dewatered and shut down for maintenance and repair. As a consequence, Reclamation has replaced this mitigation measure with a new mitigation measure (BR-11A) where all permanent and temporary GGS habitat affected by the Project would be fully mitigated as determined jointly by the Service and Department; If a snake is observed during construction, operations in the immediate area will cease, the Service will be notified, and measures consistent with the Services Appendix D (USFWS 1999) will be implemented (See **Table 6**).

As concluded in the EA/IS, implementation of the Project was anticipated to result in beneficial impacts within the WA, including increases in habitat maintenance and enhancement opportunities, as well as greater flexibility in managing flood-up schedules and decreasing the potential for disease outbreaks (such as botulism). The EA/IS concluded that potential impacts of implementing the Project would not be significant.

Both NEPA and CEQA require that the environmental assessment conclude with findings and a declaration (respectively) based on the overall project examination. The Finding of No Significant Impact (FONSI)/Mitigated Negative Declaration (MND) (of the

EA/IS) determined the implementation of the Project was anticipated to result in the following beneficial impacts:

1. Increased habitat maintenance and enhancement opportunities. (FONSI)
2. Greater flexibility in managing flood-up schedules and decreasing the potential for disease outbreaks; such as botulism. (FONSI)
3. Beneficial impact in terms of increasing habitat maintenance and enhancement opportunities. (MND)
4. Beneficial impact in terms of allowing for greater flexibility in managing flood-up schedules and decreasing the potential for disease outbreaks, such as botulism. (MND)

Furthermore, the following potential impacts of the Project were determined to not be significant:

1. Impacts to land use will be less than significant because short-term and long-term impacts to agricultural lands will be directly negotiated between the Water District and the affected property owner/operator. (FONSI as amended)
2. No impacts to wildlife and vegetation are expected because the following measures will be implemented. (FONSI)
 - (a) Preconstruction surveys will be conducted to confirm the presence/absence of special status plant species. Disturbed habitat will be restored and the success will be ensured through monitoring.
 - (b) Impacts on giant garter snake (GGS) habitat will be minimized by preconstruction surveys, construction monitoring by a qualified biologist, and acquisition of suitable offset habitat.
 - (c) Preconstruction surveys will be conducted for Swainson's hawk in accordance with CDFW protocol and impacts will be mitigated if raptors are found to be present.
 - (d) Impacts to the valley elderberry longhorn beetle (VELB) will be minimized and shrubs replanted with stems greater than 1.0 inch in diameter in accordance with the service guidelines, Mitigation Guidelines for the Valley Elderberry Longhorn Beetle. [Note: Biological surveys conducted in 2011 determined that no VELB host plants were present within the Project area].

Table 6. Comparison and Review of Impact Analysis Discussed for the Project Alternative in the EA/IS and the Supplemental EA/Addendum.

| EA/IS RESOURCE SECTION | EA/IS ANALYSIS (1998) | PROJECT ANALYSIS (2013) |
|------------------------------|--|--|
| Land Use | The EA/IS concluded impacts to land use would be less than significant because short-term and long-term impacts to agricultural lands would be directly negotiated between Reclamation and the affected property owner/operator. | This section as set forth in the EA/IS remains accurate and is unchanged by the <i>Supplemental/Addendum to the EA/IS</i> ; however the responsibility of negotiation with affected property owner/operator(s) is now transferred to the Water District. No residual impacts would occur with adherence to the mitigation program. |
| Biological Resources | <p>The EA/IS concluded no impacts to wildlife or vegetation would be expected because the following mitigation measures would be implemented:</p> <p>BR- 1: Conduct pre-construction surveys prior to final LS design to identify locations of special-status plants. Surveys must be timed to coincide with the flowering seasons of the targeted species. Following pre-construction surveys, avoid impacts to special-status plants by through facility routing.</p> <p>BR-2: Where avoidance of special-status plants is not practicable, develop and implement measures for mitigating impacts, including relocation or reestablishment of special-status plant populations. Mitigation would involve creating suitable habitat in non-suitable habitat by providing soil, water, and vegetation to replicate conditions needed to establish special-status species populations.</p> <p>BR-7: Conduct pre-construction surveys for raptors (including Swainson's hawk) prior to the peak March-through-August nesting period. Construction during the critical nesting period (March through August) will be avoided. OR if nesting pairs and fledglings are identified within 0.25 miles of construction, a monitoring program will be initiated in consultation with the CDFW.</p> <p>BR-10: Conduct pre-construction surveys for GGS. Surveys should be conducted between April 15 and June 1 by a qualified biologist. During final design, avoid all habitat features to the extent possible</p> | <p>This section as set forth in the EA/IS remains accurate and is unchanged by the <i>Supplemental/Addendum to the EA/IS</i>, except mitigation measure - BR 11 (as identified in page III-19 of the EA/IS and identified to the left) has been removed because implementing the mitigation measure would "in effect" not allow construction or excavation activities to occur in the most feasible time period to do so; however, the following mitigation measure BR – 11A, has been added to the Project: all permanent and temporary GGS habitat affected by the Project would be fully mitigated as determined jointly by the Service and CDFW; if a snake is observed during construction, operations in the immediate area will cease, the Service will be notified, and measures consistent with the Services Appendix D (USFWS 1999) will be implemented.</p> <p>The following, supplemental avoidance and minimization measures are proposed to reduce impacts to giant garter snake resulting from work conducted between October 2 and April 31:</p> <ul style="list-style-type: none"> ○ In order to exclude giant garter snakes from work areas, barriers consisting of semi-permeable silt fencing shall be installed around all staging areas where staging area margins fall within 200-feet of |

| EA/IS RESOURCE SECTION | EA/IS ANALYSIS (1998) | PROJECT ANALYSIS (2013) |
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| | <p>that contain GGS or provide suitable habitat for giant garter snake (GGS).</p> <p>BR-11: If impacts to GGS habitat cannot be avoided, employ mitigation measures to avoid direct impacts to snakes. No grading, excavating, or filling will take place within 30 feet of GGS habitat between October 1 and May 1. To ensure avoidance of impacts to individual snakes, a trained monitor will be present onsite to remove snakes prior to construction if individual snakes are found to be present.</p> <p>BR-14: Develop and implement a monitoring plan to assess the success of mitigation measures for impacts to special-status wildlife. Success criteria shall be clearly defined for all measures implemented to mitigate for project impacts to wildlife. Yearly reports should be submitted to the Service and CDFW. If success criteria are being met after 3 years of monitoring, no additional monitoring is necessary.</p> <p>BR-15: Conduct pre-construction delineations of wetlands and other waters of the United States. Request a verification of the delineated boundaries from the ACOE. Following verification of the delineation boundaries, develop measures to avoid impacts to jurisdictional wetlands.</p> <p>BR-16: After final design, quantify impacts to wetlands and other waters. Submit to COE a permit application for discharge of fill material into waters of the United States, pursuant to Section 404 of the Clean Water Act.</p> <p>BR-17: Install and maintain appropriate erosion and sedimentation controls during and following construction as specified in the required Erosion Control Plan (see Hydrology and Water Quality section).</p> <p>BR-19: Develop and implement mitigation plans for impacts to wetlands. Replace eliminated wetlands at a 2:1 ratio. Temporarily impacted wetlands should be restored onsite. Stockpile topsoil removed from wetlands and store in upland landscape positions. Following construction disturbance, restore the land surface contours and backfill the top 6 to 12 inches with stockpiled topsoil.</p> | <p>aquatic giant garter snake habitat. Fencing will be buried at least 6-inches below ground and extend at least 24-inches above the ground surface. Fencing shall be inspected daily by the monitoring biologist to ensure that the integrity of the fence is maintained.</p> <ul style="list-style-type: none"> ○ For all areas possessing aquatic habitat for giant garter snakes and for all uplands within 200-feet of aquatic habitat margins, ground will be disturbed prior to September 15 of the year in which work is expected to occur. Disturbance will include, but not necessarily limited to, scraping and grading to remove vegetation and eliminate cracks and crevices that provide giant garter snake overwintering habitat. This disturbance will include all toe drains, canal banks, and the intervening uplands where winter work is anticipated. <p>No residual impacts would occur with adherence to the mitigation program</p> |

| EA/IS RESOURCE SECTION | EA/IS ANALYSIS (1998) | PROJECT ANALYSIS (2013) |
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| | BR-20: Following project completion, monitor the site to assess mitigation success. Success criteria should be clearly defined for all measures implemented to mitigate for project impacts to wetlands. Yearly reports should be submitted to the Service and ACOE until implementation has been determined to be successful. | |
| Cultural Resources | The EA/IS stated no impacts to cultural resources would be anticipated; and therefore, no mitigation prescribed. In the event previously unidentified cultural materials are encountered and/or identified during activities associated with this project, all activities will cease, in the area associated with discovery, and a qualified archeologist and Reclamation's Regional Archaeologist will be notified and consulted on how to proceed. In the event that human remains are discovered, the discovery will be treated in accordance with the requirements of §750.5(b) of the California Health and Safety Code. Pursuant to §7050.5(c) of the CHSC, if the county coroner determines that the human remains are, or may be of Native American origin, then the Water District will ensure that the discovery shall be treated in accordance with the provisions of §5097.98(a)-(d) of the California Public Resources Code. | This section as set forth in the EA/IS remains accurate and is unchanged by the <i>Supplemental/Addendum to the EA/IS</i> . No residual impacts would occur with adherence to the mitigation program. |
| Hydrology/ Water Quality | The EA/IS concluded no impacts to hydrology/water quality are expected because instream construction would be conducted to limit turbidity levels to no greater than 20 percent over background levels, or as specified by the Central Valley Regional Water Quality Control Board. Also, an Erosion Control and Sediment Plan would be developed and implemented. | This section as set forth in the EA/IS remains accurate and is unchanged by the <i>Supplemental/Addendum to the EA/IS</i> . No residual impacts would occur with adherence to the Project design features. |
| Recreation | The EA/IS concluded no potential impact to this resource and therefore no mitigation was recommended. | This section as set forth in the EA/IS remains accurate and is unchanged by the <i>Supplemental/Addendum to the EA/IS</i> . No significant impacts/no mitigation necessary. |
| Socio- economics | The EA/IS concluded no potential impact to this resource and therefore no mitigation was recommended. | This section as set forth in the EA/IS remains accurate and is unchanged by the <i>Supplemental /Addendum to the EA/IS</i> . |

| EA/IS RESOURCE SECTION | EA/IS ANALYSIS (1998) | PROJECT ANALYSIS (2013) |
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| Energy | The EA/IS concluded no potential impact to this resource and therefore no mitigation was recommended. | No significant impacts/no mitigation necessary. |
| Air Quality | The EA/IS concluded no potential impact to this resource and therefore no mitigation was recommended. | This section as set forth in the EA/IS remains accurate and is unchanged by the Supplemental / Addendum to the EA/IS. No significant impacts/no mitigation necessary. |
| Cumulative | The EA/IS concluded that the project will not have effects that are individually limited, but cumulatively considerable. | This section as set forth in the EA/IS remains accurate and is unchanged by the Addendum to the EA/IS. Potential adverse impacts were identified within the following resource categories: <ul style="list-style-type: none"> • Biological Resources (primarily short-term impacts to habitats, some of which could be used by endangered species). • Water Quality (primarily short-term impacts from the construction of conveyance facilities across or adjacent to existing stream courses). • Land Use (primarily short-term impacts associated with installation of facilities through prime agricultural lands). |
| Growth Inducing Impacts | The EA/IS concluded no potential impact to this resource and therefore no mitigation was recommended. | This section as set forth in the EA/IS remains accurate and is unchanged by the Supplemental/Addendum to the EA/IS. No significant impacts/no mitigation necessary. |

Table 6 Notes:

The EA/IS determined that no substantial evidence exists that the project would have a negative effect on the environment based on this evaluation:

- (a) The project will not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish and wildlife species, cause a fish and wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare and endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory.
- (b) The project will not have the potential to achieve short-term goals to the disadvantage of long-term environmental goals.
- (c) The project will not have effects that are individually limited, but cumulatively considerable.
- (d) The project will not have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly.

- (e) Permanent impacts to wetlands will be minimized and wetland acres replaced if avoidance is not possible and success ensured through monitoring
- 3. No impacts to hydrology/water quality are expected because instream construction will be conducted to limit turbidity levels to no greater than 20 percent over background levels, or as specified by the Central Valley Regional Water Quality Control Board. Also, an Erosion Control and Sedimentation Plan will be developed and implemented. (FONSI)
- 4. No impacts to cultural resources are anticipated. In the event previously unidentified cultural materials or human remains are encountered, a qualified archaeologist will be notified. (FONSI)
- 5. Short-term potential impacts to the habitat of the following federal and/or state listed species: (MND)
 - (a) giant garter snake;
 - (b) valley elderberry longhorn beetle; and
 - (c) Swainson's hawk.
- 6. Short-term impacts to vegetation and wildlife habitat including wetlands, water quality, and cultural resources. (MND)

The FONSI concluded:

"Reclamation has determined that implementation of the preferred alternatives would not have significant adverse impacts on the quality of the human environment. This determination is based on analysis of environmental impacts using the best available information, through review of the comments received on the draft EA, Endangered Species Act Section 7 consultation, coordination concerning Indian Trust Assets and environmental justice implications, and the environmental commitments listed in the final EA. The proposed actions would provide delivery infrastructure to transport Level 4 water supplies to the Sutter National Wildlife Refuge and Gray Lodge Wildlife Area."

The FONSI determined that implementation of the preferred alternative (Gray Lodge Wildlife Area – Alternative GRA-9, use of the existing Water District facilities with improvements) would not have significant adverse impacts on the quality of the human environment. The MND prescribed mitigation measures intended to offset or reduce the level of potential effect from the project and subsequent actions tiering from the EA/IS evaluation. These mitigation measures are set forth in **Section V - Project Design Features and Mitigation**.

This Supplemental EA/Addendum has been prepared to fulfill obligations to clarify minor refinements to the Project under NEPA (42 U.S.C. 4321 *et seq.*); Council on Environmental Quality regulations implementing NEPA (40 CFR parts 1500–1508); the California Public Resources Code §§21000-21178; and in compliance with the State CEQA Guidelines (California Code of Regulations, Title 14 Chapter 3 §§15000-15387).

Based upon the foregoing analysis, the Project is determined to be consistent with the description of the environmental setting, environmental impacts and mitigation

measures as set forth in the originally approved *Conveyance of Refuge Water Supply Project: East Sacramento Valley Study Area Final Environmental Assessment/Initial Study*. Because there are no new or substantially more severe impacts the Supplemental EA/Addendum need not be circulated for public review.

VII. List of Preparers and Agencies Consulted

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VIII. Technical Appendices

- A. United States Department of the Interior, United States Bureau of Reclamation, and California Department of Fish and Game. *Conveyance of Refuge Water Supply Project East Sacramento Valley Study Area Final Environmental Assessment/Initial Study*, December 1997
- B. Foothill Associates. *Biological Resources Assessment*. December 2011
- C. Hansen Biological Consultants. *Giant Garter Snake Habitat and Impact Assessment*. March 2013
- D. Windmiller Archaeology Consultants. *Cultural Resources Inventory and Evaluation*. December 2011
- E. Provost & Prichard Consulting Group. *Technical Summary Regarding Strategies for Minimizing Changes in Canal Seepage Resulting from the Gray Lodge Wildlife Area Water Supply Project*. September 2011
- F. Sanders & Associates Geotechnical Engineering. *Draft Geology and Geotechnical Investigation Report*. September 2011
- G. United States Department of the Interior Fish and Wildlife Service, *Biological Opinion on Conveyance of Refuge Water Supply Project, West and East Sacramento Valley, California, 1998 and Concurrence Letter to Append, 2009*
- H. Environmental Commitment Plan/Mitigation Monitoring and Reporting Plan, 2012
- I. United States Army Corps of Engineers. *Biggs-West Gridley/Gray Lodge Wildlife Area Water Supply Project Exemption Letter*, February 27, 2012.

IX. References

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- United States Bureau of Reclamation, Finding of No Significant Impact (FONSI), August, 10, 1998. Conveyance of Refuge Water Supply Project East Sacramento Valley Study Area. Northern California Area Office, Mid Pacific Region, Sacramento, California.
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X. Personal Communication

- Bell, Krystal, U.S. Army Corps of Engineers. E-mail to Ken Whitney, Foothill Associates. February 27, 2012.
- Dobrovolny, Lorna, California Department of Fish and Wildlife, January 3, 2013.
- Leigh, Anastasia, U.S. Bureau of Reclamation. Letter to Milford Wayne Donaldson, State Historic Preservation Officer. August 20, 2012.